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The Important Question



*Written Expressly for
COAL AGE*

BY BERTON BRALEY



A NOTHER year's swiftly approaching its close
And Christmas time comes as the fleeting year goes;
The children come home for the annual spread
And spirits are gladdened and bodies are fed.
No matter if purses aren't fearfully fat,
Don't mutter and grumble and kick about that,
Be merry—but question yourselves now and then:
"What kind of a Christmas is this for MY MEN?"

You've plenty to eat and you've plenty to wear,
You've comfort and warmth and a little to spare,
But how about those who have labored for you,
Who've toiled in the workings the weary year through?
Are they spending Christmas in cottages neat
Or huddled in hovels disgracing the street?
Is the town like a town—or a grimy-walled pen?
"What kind of a Christmas is this for YOUR MEN?"

Has Christmas brought some of them hunger and want?
Is poverty stalking them, ugly and gaunt?
It isn't your fault? Well, perhaps it is not,
And it may not be theirs; can't you brighten their lot?
Won't you see that at least for one day in the year
Their homes and their hearts shall be brimming with cheer?
It isn't a matter of how things have been
But—"What sort of Christmas is this for YOUR MEN?"

We're wishing you joy and prosperity, too,
May all sorts of fortune come rolling to you;
But mingled with all of your luck we shall trust
That providence teaches you how to be just—
Yes, just to yourselves and to workers whose lives
Are spent in their labor for children and wives,
Be just—and this question won't worry you then,
"What kind of a Christmas is this for YOUR MEN?"

Ideas and Suggestions

Benefits of Prohibition

BY GEORGE N. LANTZ*

In the efforts made to promote temperance or to bring about prohibition greater stress is laid on the economic loss to the drinking class than formerly.

In the recent unsuccessful attempt to prohibit the sale of liquor in Ohio efforts were made to show that the taxes, license fees, and expenses of all sorts of the breweries and saloons were paid by the men who drink and that the consumer pays the bills. The "drys" also endeavored to show the results that would accrue from a proper expenditure of the money spent on drink. Similarly in "Pages from a Miner's Notebook" (*Coal Age*, Vol. 8, p. 756) the writer treats of the saloon evil from the standpoint of dollars and cents. After Jim Bates, the regular customer of the saloon keeper, was incapacitated for his employment he discovered that he had no funds to tide him over his difficulties and became a charge for his more thrifty neighbors.

The writer might have gone farther and related a common occurrence in many mining communities, or in fact in any labor center, for the saloon evil affects other kinds of labor than mining.

During times of temporary idleness, strikes, wage adjustments and dull business, the intemperate class regardless of their physical fitness for work often become a burden for the more thrifty element, who as a rule look after the unfortunate families of the drinking element by making donations of food, clothing, fuel and sometimes money.

ANOTHER USE FOR LIQUOR MONEY

As to what might be accomplished by another use of the money that finds its way across the bar let me set down the views of a certain railway employee speaking of a mining village of about 2,000 population—a village with which I am familiar.

Said this railway man, "I've been on this run for 20 years, and in that time there has never been a Monday morning when the brewers' agent of this town has sent less than \$2,000 to the breweries and at times it reached \$4,000. This represents the brewers' share of the profit of the saloon. If the people of the town were wise, they'd keep that money at home and every week someone could put up a \$3,000 home."

We will be more conservative than the railway employee and say \$2,500 homes. Also we will say that only one-half is spent by residents of the town, the other half coming from the surrounding neighborhoods and from transients, and we will build a home every two weeks instead of every week. Then on the supposition that there are 325 families in the village, we find that in a little over thirteen years every family could be living in a home valued at \$2,500 or have that amount in the bank.

*New Straitsville, Ohio.

It is certainly a more agreeable picture to contemplate a village of 325 homes, none of them costing less than \$2,500, than the large number of poorly kept, unpainted shacks that are seen there today.

I have intentionally confined my remarks to the money side of the liquor question in this letter, though much can be said from the standpoint of morality, hygiene, safety, etc.



How Efficient Is Your Patch?

BY N. G. NEAR

Mentally, we are all imperfect. We must admit it. We are continually saying to ourselves, "If I only knew how to do such and such a thing, I would be all right."

Sometimes we make a half-hearted effort to learn how to do that thing. Sometimes we make a really earnest effort, and as a result we actually learn how the thing is done.

This is equivalent to "putting a patch on our brain," and the thoroughness with which we learn determines the efficiency of the patch. A patch on a boiler that decreases steam leakage 10 per cent. is better than no patch at all, but it is far from perfect. Nor is a patch perfect that permits 1-per cent. leakage. That is why we always aim to make patches on steam pipes and boilers 100 per cent. efficient.

Applying this logic to ourselves, why are we so often satisfied with a 50-per cent. patch on the brain? Why 90 per cent.? Should we ever fall short of 100 per cent.?

"Well," you may say, "there should be no patching to do. We should learn one thing after the other in logical sequence."

That sounds very fine, but it is almost impossible to learn methodically. As we continue to live we learn by "jumps," and we therefore leave behind us many little "gaps" in our education that should not exist. These are the gaps that need patching. When patching time comes, therefore, let us do the job right.



Pivotal Position in a Coal Mine

BY FORNEY L. PARKER*

In a coal mine the boss who comes in closest contact with the miner is the assistant foreman, and on whether he is efficient in his daily duties of handling the men depends in a large measure the success of the mine organization.

He must be thoroughly conscientious and faithful in the performance of his duties, and to do this he must have a definite idea of every man's work and his daily progress. This requires not only the necessary daily examination of the working faces before the miners arrive for their day's shift, but also the essential visit while the men are at work. It is during this second visit that the

*Joliet, Penn.

miner should be instructed to do the necessary work in the proper manner, and if the employee does not follow the instruction of his superior officer he should be disciplined accordingly.

The obedience of the men must be gained by kindness and getting their confidence rather than by inspiring fear in them. When the employee disobeys he should be punished, and at the time the penalty is imposed be sure that he knows just what he is being punished for.

THERE SHOULD BE A FIXED STANDARD

There should be a standard for the various "stunts" performed in the mining and transportation of coal, and the assistant must see that they are done accordingly and are accomplished in a standard time.

When a new man is employed he should be instructed to perform his duties in the easiest, safest and quickest way, and not be allowed to pick up the wrong methods as practiced by the man who held the job before him or by his present "buddy."

Let your men work out the minor details of the job in their own way, for by giving them responsibility you get better results than you do by constant supervision.

All of the assistants at a mine should pull together, and they should try to improve the spirit and ideals of the mine worker. The mine foreman cannot watch the different sections of the mine as closely as his assistants, and both must depend largely upon the honor of the employee for the fullest performance of work.

In issuing an order or proposing new work the safety of the miner is of first consideration, and if the policies which are here set forth are carried out, it will eventually lead to the greater efficiency and safety of the miner and result in winning the maximum quantity of coal from the mine.



The Boiled-Shirt Job

The reason for the preponderance of foreign population about the coal mines today is the unwillingness of Americans to do the rough work connected with the mining industry. The skilled miner of yesterday sent his son to school, and college if possible, to the end that he might have an easy life—that he might land a "boiled-shirt job."

The young American coal miner is rare today. The place vacated by him in the mines has been taken by the foreigner. And now the immigrants' sons are in turn looking for a job that will enable them to be dressed up all of the time.

It is the old failing of false pride—the belief that there is something demeaning in manual labor. The old saying that "clothes do not make the man" is mighty true when applied to the men of the coal-mining industry. Many a young fellow is working for a starvation salary in an office when he could be earning twice as much in the mine. And the mines need these young men. Without them our miner of tomorrow will again be the ignorant immigrant from foreign shores with his constant need of supervision.

BACK-TO-THE-MINES MOVEMENT IS NEEDED

We have recently had a back-to-the-farm movement sweeping the country. What the mining industry needs is a back-to-the-mines movement for these young fellows

who could become skilled miners. There is not room for all at the top, and whether being at the top is wearing a white collar or digging coal in the mines is only a matter of personal opinion.

There is a real opportunity for every young man in the mine. The professions are crowded; superintendents, engineers and clerks are plentiful. Only a few are rising, while many are standing still, and very seldom is the compensation commensurate with the work and responsibility assumed.

On the other hand the skilled miner is in demand. While he has not received much recognition in the past, a better time is coming for him. As our method of mining in the future will be one of concentration, the skilled miner will be singled out from the riffraff that fill our mines today.

There are respect, good wages and plenty of work for the skilled coal miner of tomorrow, while the hazards of his work will be reduced to a minimum.



An Interesting Letter

The following letter will appeal to many coal-mine managers as representative of conditions at their own plants. The general sense of the letter might be absorbed to advantage by the under officials at many mines. The letterhead and names in the letter have been changed to disguise its origin.

NORTH AMERICAN COAL AND COKE CO.
Operating Department

Chicago, Ill., Nov. 13, 1915.

Mr. Henry Porter, Supt.,
Carbon City Mines.

Dear Sir: Immediately on receipt of your letter of Nov. 6, I wrote a circular letter to all of the other superintendents of the company asking them if they had in their employ an assistant electrician competent to take charge of the electrical work at your plant. All the replies received were very similar—they had men who had had sufficient experience, but they hesitated to recommend them because they did not know whether they would make good as bosses.

For a long time I have had in mind the advisability of writing a circular letter to all of our superintendents bearing on the very point raised by these letters, and now that the superintendents themselves to a man have pulled down the bars, I will no longer hesitate—I'll make a circular letter of this.

As I see it, gentlemen, the highest service that a superintendent can render his company is manifested when he develops a system that obtains from each employee the best that he is capable of. When a superintendent has in mind such a purpose it seems to me that he must always have more electricians and boss drivers and firebosses and weighmen waiting for a chance than the company could use in a hundred years.

Everyone realizes that the world is full of square pegs in round holes, but how many are competent to change these misfits around? I'll answer my own question by saying, Master pilots only, and I'll go a little further while my courage is up and remark that the "Big Boss," as you call him, seems to be the only one who can measure up to the test, and he'll prove it by calling attention to the fact that every one of his superintendents privileged to read this came up from his ranks. Why?

Some of you were engineers, some were mine foremen and still others chief clerks, but I thought I saw higher talent in each one, and you haven't disappointed me very much. Now sit you down, every last one of you, while your dander is up and write me a frank letter telling me just how I have misjudged you, and as a sort of postscript put down the names of some fellows you have your eyes on right now.

It's a pleasure to help others, especially when the others are a bit appreciative; please don't forget that, and also don't forget that I still have my eyes on every one of you—perhaps I need an understudy. Yours very truly,

CARLETON E. DAVIS,
General Manager.

Mine-Hoist Calculations

BY F. L. STONE*

SYNOPSIS—The first of a series of articles bearing on this subject. The case of an unbalanced slope hoist is considered, each successive step in the calculations being exemplified.

The object of this and succeeding articles is to set before the mine operator a clear and concise method for the solution of the majority of hoisting problems. Various conditions of hoisting will be considered and the same method of solution applied. The only knowledge required to intelligently follow the various steps is a clear understanding of the fundamental laws governing mechanics and motion.

There are numerous methods used by engineers for calculating hoist cycles, but the moment method, while perhaps a little longer than some others, is almost universal

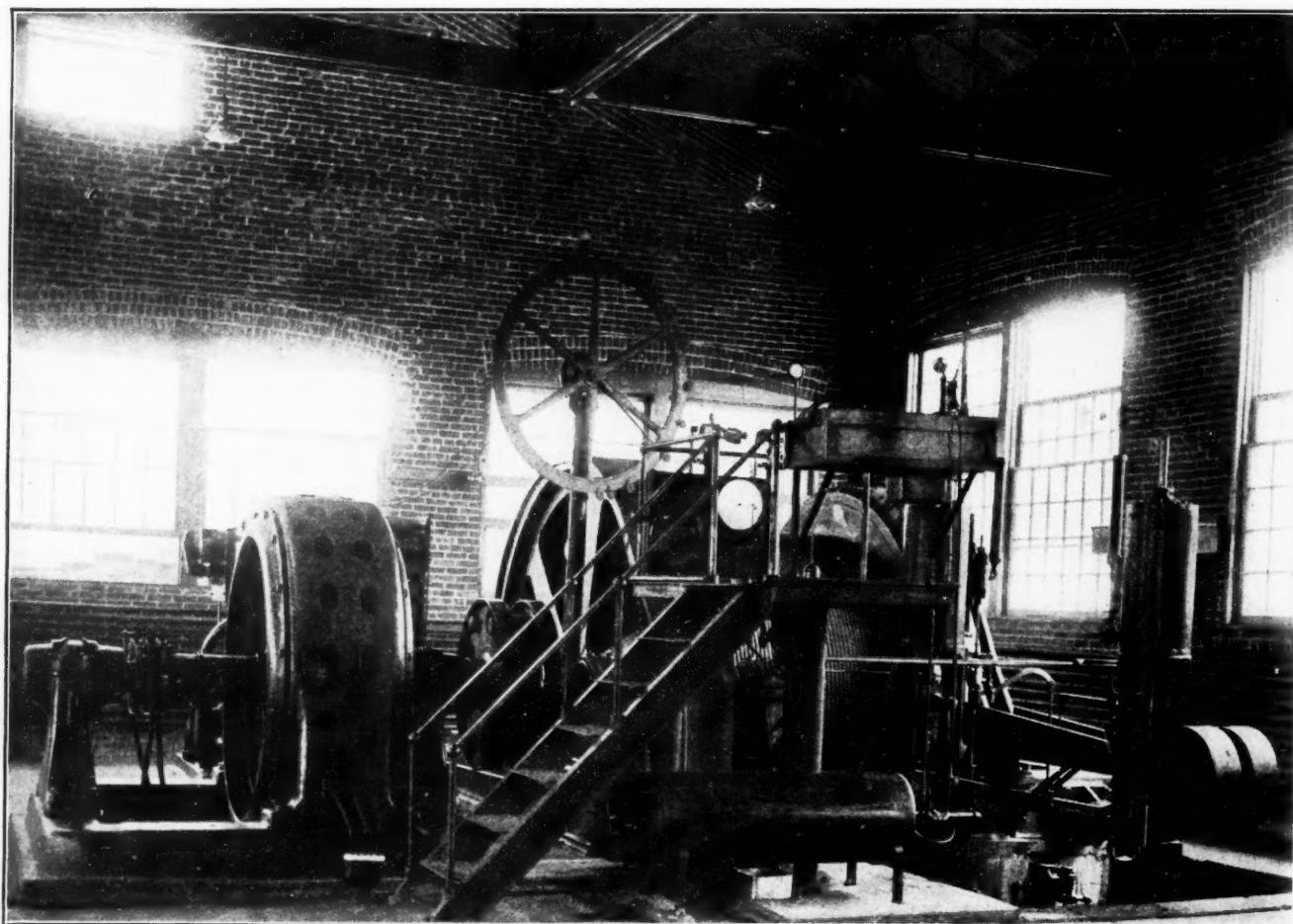
1. Shallow shaft, unbalanced.
5. Shallow shaft, unbalanced, with counterweight.
6. Deep shaft, balanced.
7. Conical drums.
8. Odd-shaped drums.

For the sake of simplicity each case will be illustrated by an example worked out in detail, the examples being selected from actual mining conditions.

CASE 1. UNBALANCED SLOPE

Length, feet	2,000
Tonnage in 8 hr.....	2,800
Percentage of grade	6
Cars per trip.....	40
Rest at top, minutes.....	3
Rest inside, minutes	2
Weight of coal per car, tons	2
Weight of car, tons	1 1/2

To assure tonnage, calculations are based on securing the entire output of the mine in 7 hr.



GENERAL VIEW OF 700-HP. HOIST AT CROWS NEST MINE OF KEYSTONE COAL AND COKE CO.

in its application and the simplest arithmetic is employed in the final solution. This method will be used throughout.

The following cases will be considered and solutions worked out in detail.

1. Slope haulage, unbalanced.
2. Slope haulage, balanced.
3. Shallow shaft, balanced.

*Power and mining engineering department, General Electric Co., Schenectady, N. Y.

$$\text{Trips per hour} = \frac{2,800}{2 \times 40 \times 7} = 5.$$

$$\text{Time of round trip} = \frac{3,600}{5} = 720 \text{ sec.}$$

$$\text{Total rest top and bottom per trip} = 360 \text{ sec.}$$

$$\text{Running time up and down} = 720 - 360 = 360 \text{ sec.}$$

$$\text{Running time one way} = \frac{360}{2} = 180 \text{ sec.}$$

If the speed were constant throughout the running, the

velocity in feet per second would be $\frac{2,000}{180}$, but during acceleration and retardation the average velocity is only one-half the running velocity because the load starts at zero speed and ends at V speed during acceleration, and during retardation it starts at V and ends at 0.

Let

D = Total distance traveled;

V = Running velocity;

t_a = Time of acceleration;

t_r = Time of retardation;

T = Total running time of trip.

Then the space passed over during acceleration = $\frac{Vt_a}{2}$

and during retardation = $\frac{Vt_r}{2}$ and the distance passed

over at full speed = $D - \frac{Vt_a + Vt_r}{2}$.

The time of full speed running = $T - (t_a + t_r)$.

$$V = \frac{D - (Vt_a + Vt_r)}{T - (t_a + t_r)}$$

$$V(T - (t_a + t_r)) = D - V \frac{(t_a + t_r)}{2}$$

$$V(T - (t_a + t_r)) + \frac{(t_a + t_r)}{2} = D \quad V = \frac{D}{T - \frac{t_a + t_r}{2}}$$

Assume that $t_a = 20$ sec. and $t_r = 10$ sec. Then

$$V = \frac{2,000}{180 - 15} = 12.1 \text{ ft. per sec.}$$

Such a load as described would require a rope $1\frac{3}{8}$ in. in diameter, and this size of rope should not be coiled on a drum of a diameter less than 7 ft., which gives a ratio of rope diameter to drum diameter of slightly over 1:60. If the drum is 7 ft. in diameter, each convolution will contain approximately 22 ft., and there will be about 91 turns in all. This would be wound in two layers. To be absolutely accurate the change in diameter due to the second layer being wound on top of the first should be taken into account. This is of such small importance that it will not be considered in the present problem. All calculations will be made on the basis of a constant drum diameter of 7 ft. The drum will therefore make $2,000$ turns = 91.

MOMENT VALUES SHOULD BE PLOTTED

It will be well to plot the values of the individual moments on a cross-section sheet as soon as calculated, using the vertical scale for moments and the horizontal scale for turns.

It must be borne in mind that percentage of grade as given in coal-mine work is in reality the sine of the angle which the slope makes with the horizontal, and the rope pull due to the weight alone is W times this sine.

Weight of up-load = $(4,000 + 3,000) 40 = 280,000$ lb.

Effective weight (or rope pull) = $280,000 \times 0.06 = 16,800$ lb.

Moment at zero turns (start) = $16,800 \times 3.5 = 58,750$.

Moment at 91 turns (finish) = $16,800 \times 3.5 = 58,750$.

Rope of $1\frac{3}{8}$ in. in diameter weighs 3 lb. per ft.

Effective weight = $3 \times 2,000 \times 0.06 = 360$ lb.

Moment at zero turns = $360 \times 3.5 = 1,260$.

Moment at 91 turns = 0.

Rolling friction = 35 lb. per ton.

If the angle the slope makes with the horizontal is greater than 8° (14%), then the effective weight on the track will be found by multiplying the weight by the cosine of the slope angle. If, however, as in the case under consideration, the angle is less than 8° the cosine is so close to unity it may be considered as such and the entire weight assumed as being normal to the track.

$$\frac{280,000}{2,000} = 140 \text{ tons}$$

$140 \times 35 = 4,900$ lb. rolling friction.

Moment due to rolling friction:

Zero turns = $4,900 \times 3.5 = 17,150$.

At 91 turns = $4,900 \times 3.5 = 17,150$.

Rope friction is one of the most variable quantities to be contended with in slope haulages. The conditions

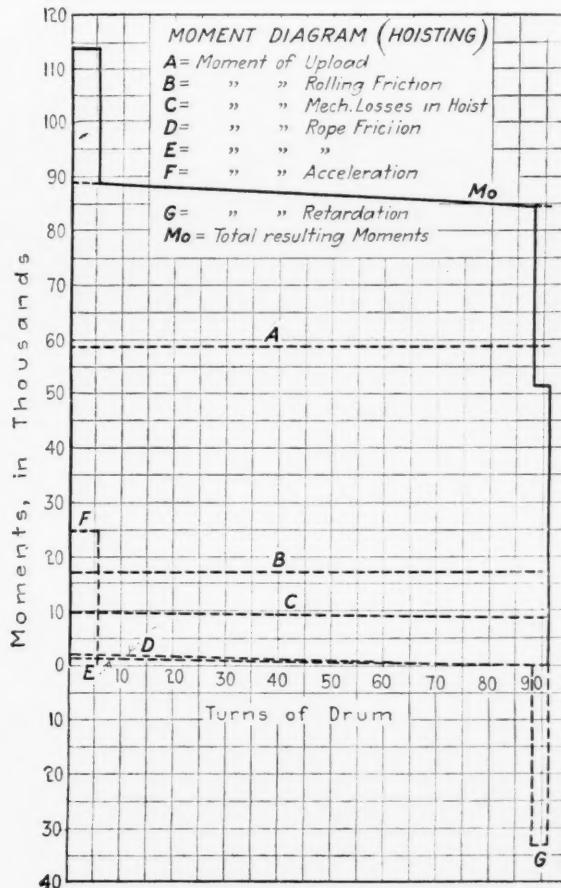


DIAGRAM OF MOMENTS DURING HOISTING

of the rollers and their spacing play an important part. However, experience has shown that 200 lb. per ton of normal pressure seems a safe figure. The remarks in regard to the pitch of the slope and the cosine of its angle apply to the rope as well as to the load. Therefore

$$\frac{2,000 \text{ ft.} \times 3}{2,000} = 3 \text{ tons}$$

$3 \times 200 = 600$ lb. rope friction at start.

Moment of rope friction:

Zero turns = $600 \times 3.5 = 2,100$.

At 91 turns = $0 \times 3.5 = 0$.

SUMMATION OF MOMENTS

	Turns	
	0	91
Up-load	58,750	58,750
Rope	1,260	9
Rolling friction	17,150	17,150
Rope friction	2,100	0
Total moments	79,260	75,900

The assumption of the proper percentage to be used for the losses in the hoist itself is a subject on which few or no reliable data can be found. The question becomes more complicated in the case of balanced hoists where the ratio between the total mass moved in the shaft or slope and the mass of coal or ore hoisted is much greater than in unbalanced haulages such as the one being considered. It is obviously incorrect to assume a percentage of the net moments without regard to total weight on the drums. Such assumptions can easily be reduced to an absurdity by considering a balanced shaft with both cages loaded. The net moment is zero and any percentage of this value would be zero.

In the case under consideration, however, it will be safe to assume 80 per cent. as the efficiency of the hoist

MOMENT DIAGRAM (LOWERED EMPTIES)

- A = Moment Down Load
- B = Rolling Friction
- C = Hoist Mech. Friction
- D = Rope Friction
- E = " Load
- F = Acceleration
- G = Retardation
- Mo = Total

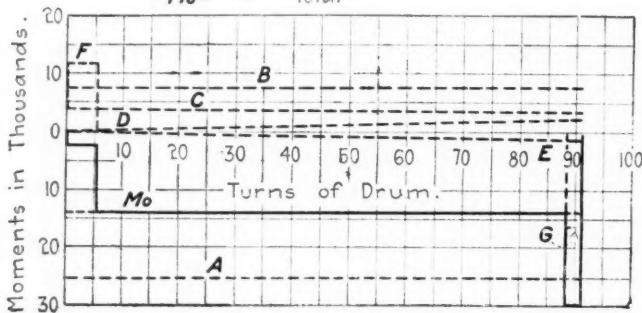


DIAGRAM OF MOMENTS WHILE LOWERING EMPTIES

proper from motor shaft to rope. Other cases will be discussed later.

Friction moment at zero turns:

$$\frac{79,260}{0.80} - 79,260 = 9,740$$

At 91 turns the moment is

$$\frac{75,900}{0.80} - 75,900 = 8,700$$

Total net moments exclusive of acceleration and retardation:

	Turns	
	0	91
Total, less friction	79,260	75,900
Mechanical friction	9,740	8,700
	89,000	84,600

The problem is now completed with the exception of determining the moment due to accelerating and retarding the entire mass. For easy reference the following fundamental equations applying to mass and motion are recorded:

$$M = \frac{w}{g} \quad (1)$$

$$v = a \times t, \text{ or } a = \frac{v}{t} \quad (2)$$

$$S = \frac{v \times t}{2} \text{ or } \frac{a \times t^2}{2} \text{ or } \frac{v^2}{2a} \quad (3)$$

$$F = ma = \frac{wa}{g} \quad (4)$$

$$\text{Stored energy} = \frac{mv^2}{2} \quad (5)$$

Where

M = Mass;

w = Weight in lb.;

a = Rate of acceleration in ft. per sec. per sec.;

g = 32.2 (acceleration in ft. per sec. per sec., due to gravity);

S = Distance or space passed over during acceleration or retardation;

v = Velocity in ft. per sec.;

t = Time in seconds during which *v* is changing;

F = Force in lb.

In the case under consideration the mass to be accelerated from rest to running speed (*v*) consists of the coal, cars, rope, drums, track rollers, etc. This is summed up as follows: Up-load, 280,000 lb.; rope, 6,000 lb. wound on drum; rope, 500 lb. holding turns and rope between drum and end of trip; total, 286,500 lb.

If acceleration is to be accomplished in 20 sec.,

$$v = 12.1 \quad t_a = 20 \quad a = \frac{12.1}{20} = 0.605$$

$$F = \frac{286,500 \times 0.605}{32.2} = 5,400$$

$$\text{Moment} = 5,400 \times 3.5 = 18,900 \quad \frac{18,900}{0.80} = 23,600$$

HOIST PROPER

The drum is 7x6 ft. and should weigh with gears, etc., approximately 40,000 lb. The radius of gyration will be about 75 per cent. of the drum radius, or 2.62 ft.

Therefore, the WR^2 of the hoist proper will be $40,000 \times 2.62^2 = 275,000$.

In order to simplify matters find the effective weight of the drum if it were concentrated at the drum radius; that is, 3.5 ft.

$$WR^2 = 275,000 \quad R = 3.5 \text{ ft.} \quad W = \frac{275,000}{3.5^2} = 22,500$$

This weight may be considered as traveling at rope speed—that is, 12.1 ft. per sec.—and could have been added directly to the weight of trip and rope.

$$v = 12.1 \quad a = 0.605 \quad F = \frac{22,500}{32.2} \times 0.605 = 425$$

$$\begin{aligned} \text{The acceleration moment} &= 425 \times 3.5 = 1,480. \\ \text{Acceleration of material in slope} &= 23,600. \\ \text{Total acceleration} &= 25,080. \end{aligned}$$

DURING RETARDATION ENERGY IS RELEASED

During retardation the energy stored in the moving system has to be given up. In some systems of drive it is partly restored to the line and partly used in lifting the load through the remaining distance of travel. For instance, if a system weighing 100,000 lb. is moving at the rate of 10 ft. per sec., it has stored in it $\frac{100,000 \times 10^2}{32.2}$

$$= 310,000 \text{ ft.-lb., or } \frac{310,000}{550} = 564 \text{ hp.-sec., which may}$$

be dissipated at the rate of 564 hp. for 1 sec., or 56.4 hp. for 10 sec. or at any other rate. It is evident that since during the retardation power is released by the moving parts this power must be given an algebraic sign opposite to the sign used when power is absorbed by the hoist.

Since the retardation is accomplished in one-half the time of acceleration—that is, 10 sec.—the value a will be twice what it was during acceleration. Other values will remain the same. It is therefore possible for the sake of brevity to multiply the acceleration moments by the inverse ratio of the times. Thus

Moment of retardation of up-load

$$\frac{18,900 \times 20}{10} = -37,800$$

Amount getting back to motor shaft = $-37,800 \times 0.80$
= $-30,240$.

Moment of retardation of the drums =

$$\frac{1,480 \times 20}{10} = -2,960$$

Total, $-33,200$

Note that in the acceleration and retardation of the drums proper no efficiency has been included. The reason for the omission is that while energy is being stored or given up by the drums there is little or no loss due to this alone. There would be no additional rope stress which in turn produces additional bearing loss. If the hoist is geared, there is added gear loss, but the amount should be small. Since the losses in the hoist proper are taken care of as a percentage of the running horsepower and the horsepower due to the acceleration of the load, it has been decided to omit any correction for loss due to the acceleration or retardation of the drums.

Turns of drum during acceleration and retardation must be calculated so that the moment values may be plotted.

This may be found in a number of ways, but the simplest seems to be the following:

Total turns = 91.

Total time = 180 sec.

$$t_a = 20 \quad t_r = 10 \quad \frac{t_a + t_r}{2} = 15$$

$$\text{Revolutions per second} = \frac{91}{180 - 15} = 0.55$$

Since the running velocity of the drum is 0.55, r.p.s., the number of turns during acceleration =

$$\frac{0.55 \times 20}{2} = 5.5$$

The number of turns during retardation =

$$\frac{0.55 \times 10}{2} = 2.75$$

TOTAL SUMMATION OF MOMENTS

	0	5.5	5.5	88.25	88.25	91	Turns
Up-load	89,000	88,800	88,800	84,700	84,700	84,600	
Acceleration and retardation ...	25,080	25,080	0	0	-33,220	-33,220	
	114,080	113,880	88,800	84,700	+ 51,480	+ 51,380	

To convert the moments into horsepower it will be necessary to multiply the moment by the speed in feet per second and divide by 550.

$$\text{H.P.} = \frac{\text{Force} \times \text{Velocity (in ft. per sec.)}}{550}$$

$$= \frac{\text{Force} \times 2\pi R \times \text{r.p.s. (of drum)}}{550}$$

$$= \frac{\text{Force} \times R \times 2\pi \times \text{r.p.s.}}{550}$$

$$= \frac{M \times 2\pi \times \text{r.p.s.}}{550}$$

where R = radius of drum in feet.

Turns	Moment	H.P. = $\frac{(2\pi M \text{ r.p.s.})}{550}$	Time
0	114,080	715	0
5.5	113,880	714	20
5.5	88,800	558	20
88.25	84,700	532	170
88.25	51,480	324	170
91	51,380	323	180

The horsepower value at zero turns is of course zero, since the speed is zero. The value given in the table is known as horsepower torque, or horsepower that would exist if the motor or load were up to speed. By glancing at the horsepower-time curve, it will be seen that the operator starts the trip and accelerates for 20 sec. with a motor output of $71\frac{1}{2}$ hp. At the end of 20 sec. acceleration ceases and the horsepower drops to 558.

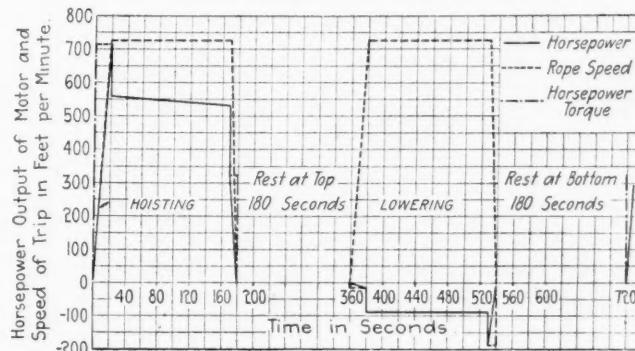


DIAGRAM OF HORSEPOWER, ROPE SPEED AND HORSEPOWER TORQUE

This speed is held for 150 sec., the horsepower falling to 532, because the rope load and friction have been decreasing during the up-trip. At 170 sec. the retarding is begun, and the stored energy plus 324 hp. output from the motor, will be enough to bring the trip the rest of the way.

LOWER THE EMPTY TRIP

In the majority of slopes of this nature the lowering is accomplished by unclutching the drum and letting the motor stand idle. The energy given up by the descending trip is converted into rolling friction and friction on the brake of the hoist.

It is possible and entirely practical in case of induction motor-driven hoists to restore part at least of this energy to the line. This is accomplished by starting the motor with its trip in the lowering direction and as full speed is reached throwing the control handle into the full on position. The load will then overhaul the motor, tending to drive it above synchronism. The motor will then become a generator and return such energy to the line as is not absorbed by friction of moving parts. In bringing the trip to rest the controller is thrown to the off position and the brakes applied as usual.

It will be instructive to find how much energy the example given would return to the motor while lowering. It must be remembered that all friction values are positive, since they require power, and the energy given up by the trip will be negative.

Moment of trip:

$$\text{Weight} = 3,000 \times 40 = 120,000 \text{ lb.}$$

Effective weight = $120,000 \times 0.06 = 7,200$ lb.
 Moment at 0 turns = $-7,200 \times 3.5 = -25,200$
 Moment at 91 turns = $-7,200 \times 3.5 = -25,200$.
 Moment of rope:

Moment at 0 turns = 0.
 Moment at 91 turns = $-6,000 \times 0.06 \times 3.5 = -1,260$.
 Moment of rolling friction:
 $120,000$ lb. = 60 tons.
 $60 \times 35 = 2,100$ lb.
 Moment at 0 turns = $2,100 \times 3.5 = 7,350$
 Moment at 91 turns = $2,100 \times 3.5 = 7,350$.

ROPE FRICTION

The total weight of the rope = 6,000 lb. = 3 tons at 200 lb. friction per ton = 600 lb.

Moment at zero turns = 0.

Moment at 91 turns = $600 \times 3.5 = 2,100$.

SUMMATION OF MOMENTS LESS MECHANICAL FRICTION OF HOIST

	Turns
Down trip	0
Down rope	0
Rolling friction	+7,350
Rope friction	0
	<hr/>
	-17,850
	<hr/>
	-17,010

Assumed mechanical efficiency of hoist = 80 per cent.

At zero turns $-17,850 \times 0.8 = -14,000$, or the frictional loss = 3,850.

At 91 turns $-17,010 \times 0.8 = -13,608$ or frictional loss = 3,402.

Total net moments exclusive of acceleration and retardation:

	Turns
Mechanical friction	-17,850
Total	-14,000

ACCELERATION AND RETARDATION

The total moving parts have to be accelerated exactly the same as in the case of hoisting. Since it will require power to do this, the sign will be positive as before.

Weight of trip 120,000 lb.
 Weight of rope 6,500 lb.

Total weight in slope 126,500 lb.
 Acceleration in 20 sec. as before,

$$v = 12.1 \quad a = 0.605 \quad F = \frac{126,500 \times 0.605}{32.2} = 2,375$$

Moment = $2,375 \times 3.5 = 10,380$

Weight of drum = 22,500 lb.

$$F = \frac{22,500 \times 0.605}{32.2} = 422$$

Moment = $422 \times 3.5 = 1,480$

Total acceleration moment, $\frac{11,860}{11,860}$

Retardation in 10 sec., as before,

Cars and rope weigh 126,500 lb.

$$a = \frac{12.1}{10} = 1.21 \quad F = \frac{-126,500 \times 1.21}{32.2} = -4,750$$

Moment = $-4,750 \times 3.5 \times 0.8 = -13,296$

$$\text{Drums as before } \frac{-1,480 \times 20}{10} = -2,960$$

Total retarding moment, $-16,256$

Turns during acceleration and retardation same as during hoisting; that is, 5.5 for acceleration and 2.75 for retardation.

TOTAL SUMMATION OF MOMENTS					
	Turns	Turns	Turns	Turns	Turns
Net load	-14,000	-13,900	-13,900	-13,650	-13,650
Acceleration and retardation	11,860	11,860	0	0	-16,256
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
	-2,140	-2,040	-13,900	-13,650	-29,906
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>

$$\text{Horsepower as before} = \frac{2 \pi M \times \text{r.p.s.}}{550}$$

Turns	Moment	Horsepower	Time
0	-2,140	-13.5	360
5.5	-2,040	-12.7	380
5.5	-13,650	-85.6	380
88.25	-13,900	-87.3	530
88.25	-29,906	-188	530
91	-29,864	-187.5	540

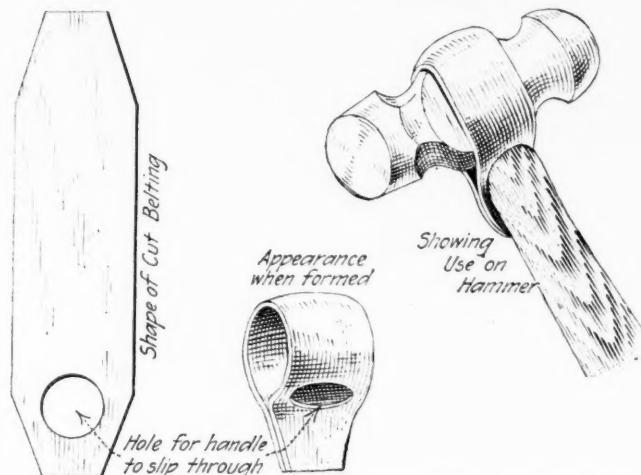
This concludes the calculations for the determination of the duty cycles for an unbalanced slope haulage for both hoisting the loads and lowering the empties. The duty cycles as plotted show the power to be delivered by the motor at its coupling to the hoist when it is raising the load and the power that would be put into the motor at its coupling by the downgoing empties. The speed as shown on the duty cycles is the same for both lowering and raising.

If the lowering were accomplished with the motor pumping back into the line, as is entirely practical in this case, the speed of lowering would be a few points in percentage above the speed of hoisting, as the motor would have to run above synchronous speed before it could become a generator.

The determinations of the proper rating for a motor to meet this cycle will be taken up later in this series of articles.

A Handy Soft Hammer

An ordinary engineer's hammer can be made to serve in place of a mallet for use on wood or other soft materials by using a piece of leather or belting in the manner shown in the drawing. A hole is cut in the leather large enough to be slipped over the end of the handle



ENGINEER'S HAMMER WITH LEATHER CUSHIONING

and the leather is then slipped to the head of the hammer. The leather is then flapped over the head of the hammer and nailed onto the handle, or the two ends are wrapped to the handle with several turns of fine wire. The hammer is used sidewise on wood, which brings the leather belting into play and softens the blow. In this way the user has a hammer ready for various uses in a compact and convenient form. The leather will wear for a long time.—American Machinist.

Canonsburg Gas Coal Co.'s Plant

BY C. M. MEANS*

SYNOPSIS—An interesting installation where both alternating and direct current are purchased. This obviates the use of a substation. Electric power is used to drive the fan, pumps, mining machines and haulage. An electric hoist is also employed to lift the coal 150 ft.

It is a well-recognized fact that the design of a mining plant should take into account the size, maximum economical output and life of the mine. The following description covers equipment at a mine of limited area where for commercial reasons it is desirable to limit the daily output to a certain amount.

The Canonsburg Gas Coal Co. has opened a mine in Washington County, Pennsylvania, tapping the Pittsburgh

tion and used to operate mining machines, locomotive haulage and all the pumps that are located in the advance workings.

Alternating current is transmitted at high voltage to an outdoor transformer station, at which point the current is stepped down to 440 volts for use at the mine. Direct current is transmitted about 2,000 ft. from the power company's substation to the mine opening, but at a little later date when the underground workings are developed, it will be possible to carry the direct current over a circuit taken down a borehole close to the substation and tap the underground distribution at a central point, thereby securing good voltage regulation throughout the entire mine with a minimum amount of copper for feeder lines.

Ventilation is effected with a disk fan belt-driven by a



TIPPLE AND HEADFRAME OF CANONSBURG GAS CO.'S MINE

measures with a 154-ft. shaft and an equipment designed for a capacity of 1,000 tons per 8-hr. day. It happens that this mine is in a locality where power can be secured from either of two power companies that serve coal mines extensively. One company was in a position to furnish both alternating and direct current, and the contract was closed with this concern, as the rates of the two companies for alternating power did not differ materially. Direct current is purchased at the rates prevailing for alternating current plus the actual cost of conversion.

Since the company is able to purchase both kinds of current, the use of a substation at the mine is unnecessary. Alternating current at 440 volts is being furnished for the operation of the hoist, ventilating fan and pumps at the bottom of the shaft. Direct current at 500 volts is taken from the busbars of the trolley company's substa-

variable-speed induction motor. A small fan and motor are used for the present, but as soon as the ventilation conditions and requirements are thoroughly ascertained a fan designed to meet the actual conditions at the highest efficiency will be installed, together with a motor of proper size and operating characteristics. Owing to the uncertainty of ventilation requirements at a new mine and the low efficiency of a large fan and motor, it is not advisable to attempt to install a permanent fan until the operating conditions have been fully ascertained.

DESCRIPTION OF HOISTING OUTFIT

The hoist is placed at the end of the shaft and consists of a 60-in. single-drum Lidgerwood hoist using a 1½-in. rope. It is provided with post brakes and single reduction herringbone cut-steel gears properly protected. The motor consists of a 100-hp. three-phase 60-cycle 440-volt slip-ring motor, connected to the hoist through a

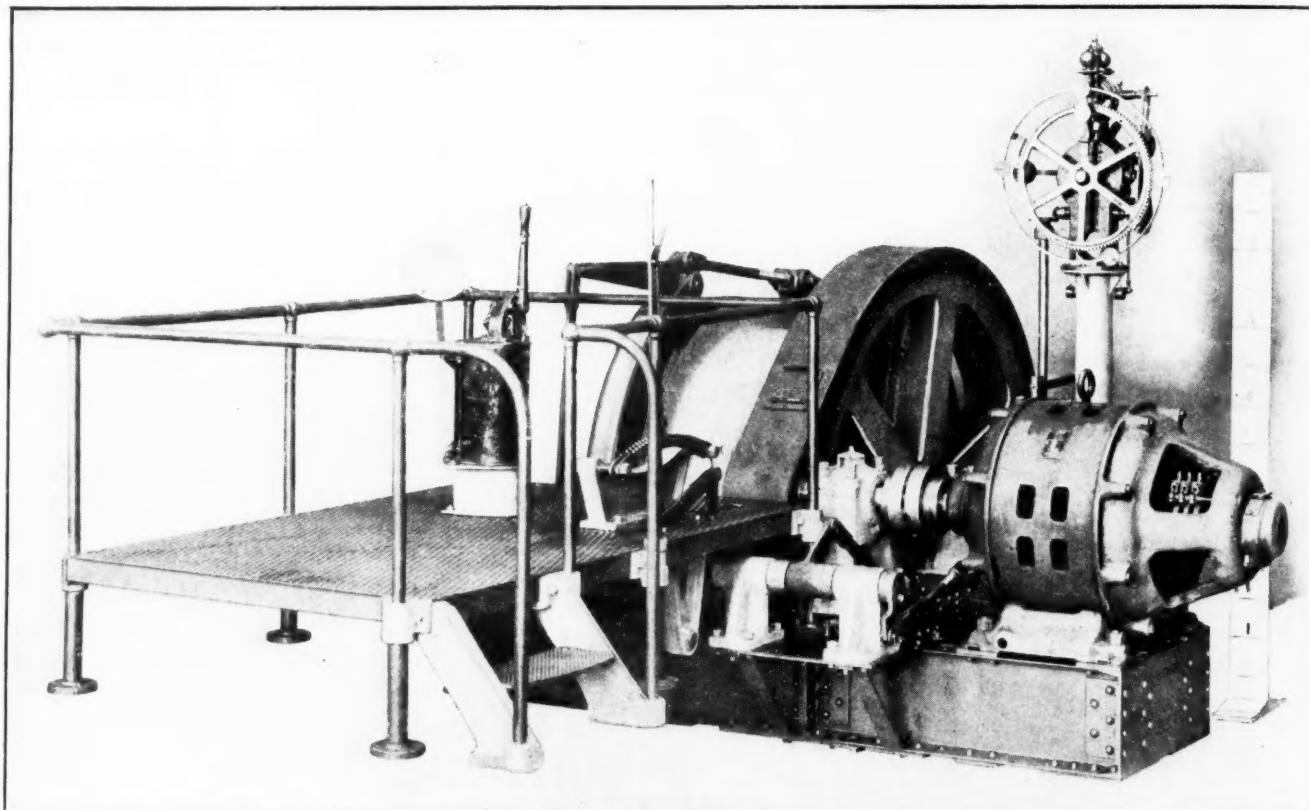
*Pittsburgh, Penn.

flexible coupling specially designed for heavy reversing duty. The control is of the contactor type, and acceleration is performed automatically.

A suitable safety device is included, which prevents overspeeding and overwinding. It also compels slowing down at the extremes of travel and brings the hoist to rest by setting the brake and cutting off the power should the operator fail to do so. The theoretical power required to hoist a ton of coal at this mine was calculated to be 0.361 kw.-hr. In actual practice it was found that the current consumption was 0.412 kw.-hr. per ton. The duty cycle curve attached herewith shows the operating conditions and the maximum demand created in hoisting.

Winter Meeting of W. Va. Coal Mining Institute

The semiannual meeting of the West Virginia Coal Mining Institute will be held at Fairmont, W. Va., Dec. 8-9, 1915. The Wednesday morning session will open at 10 o'clock, when the following papers will be read: "Relation of Mine Officials to the Consumer," by R. Z. Virgin, *Colliers*, W. Va., and "Why Buy a Storage Battery Locomotive," by J. R. Cameron, Cincinnati, Ohio. At 2 o'clock in the afternoon R. J. Beaman, Cincinnati, Ohio, will read a paper on "Uniform Accounting and Cost Records as Applied to Coal Mining," and G. E. Greer, Morgantown, W. Va., will follow with a paper entitled "Pro-



LIDGERWOOD ELECTRIC AUTOMATIC HOIST AT THE CANONSBURG PLANT

The pumping at the bottom of the shaft is accomplished with plunger-type pumps driven with 440-volt alternating-current motors. Sufficient pumping capacity and sumpage are provided so that all pumping can be done when the other power requirements at the mine are smallest, during what is termed the off-peak period. This results in the corporation securing a low rate for the power used in pumping.

The haulage equipment at present consists of one six-ton gathering locomotive, but additional locomotives of proper size will be added as the workings become extended and the capacity increases up to normal.

The coal is undercut with breast-chain machines, used because of the large amount of narrow work. When it is found that shortwall or other types of mining machines can show an economical advantage, they will be installed, but for the present only those of the breast type will be used.

I am indebted to H. A. Davis, president of the company, for the courtesy extended in securing the information from which this description was prepared.

jecting a Mine on the Panel System," after which a business session will be held.

On Thursday at 9:30 a.m., the following papers will be read: "Some Suggestions and Ideas Based on Observation," by J. W. Bischoff, Elkins, W. Va.; "The Demonstration of a Portable Gas Detector," by G. A. Burrell, Pittsburgh, Penn.; "Day Labor in Bituminous Mines," by G. S. Brackett, Flemington, W. Va. In the afternoon at 2 o'clock papers will be read on "Welfare Engineering as Applied to Coal Mines," by W. F. Hyde, Wheeling, W. Va., and "Needed Reforms in the Coal Mining Industry," by K. F. Schoew, Huntington, W. Va. The afternoon session will end with a symposium relating to the question, "What is the Matter with the Coal Business?" In the evening at 8 o'clock President J. C. McKinley, of Wheeling, W. Va., and Judge W. S. Haymond, of Fairmont, W. Va., will address the institute on matters of interest and importance.

The day sessions will be held in the assembly room of the Watson Building; the meeting place for the evening sessions has not yet been announced.

Novel Combination Locomotive

BY E. C. DE WOLFE*

SYNOPSIS—Mounting the storage battery of a combination locomotive on a low platform carried between two swiveling trucks each provided with a motor, one pair of drivers and one pair of bogies not only greatly facilitates rounding sharp curves in the track, but provides against electrical overload through wheel slippage. Split-winding of the motors gives two speeds at rated drawbar pull on either battery or trolley.

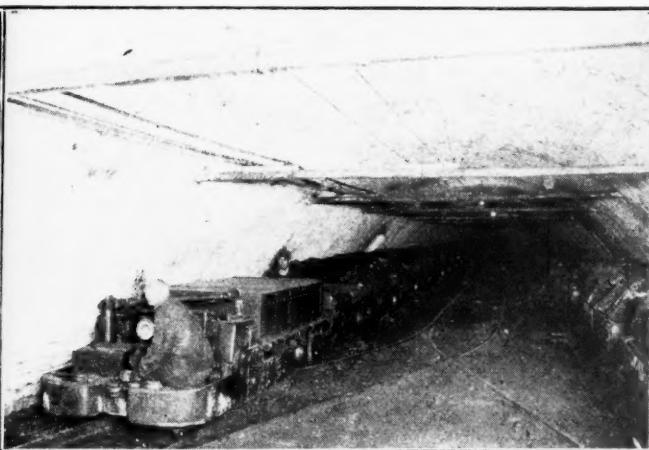
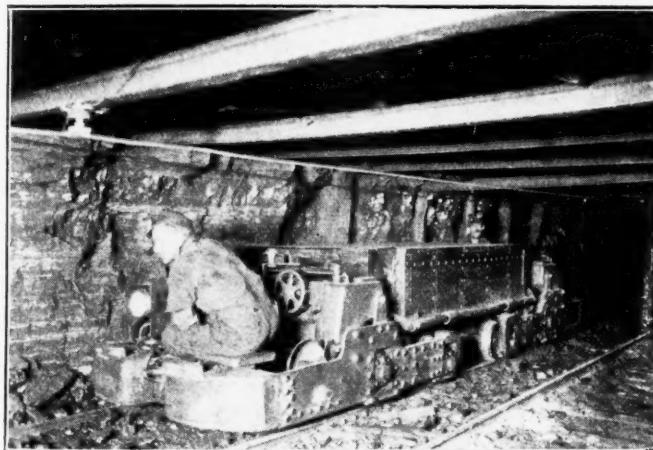
Not in days of time nor miles of travel can one find a more enthusiastic enthusiast on the storage-battery locomotive proposition than H. M. Stewart, superintendent of the Grant Coal and Mining Co.'s operation at New Goshen, Ind., 11 mi. north and west of Terre Haute. He admits that he has a large ampere-hour capacity of experience, information and opinion on which he can draw heavily for extended periods without slipping a wheel

disadvantages and high cost of the storage battery and the locomotive which it drives. The type will undoubtedly be developed in design and its adaptability to mine conditions thereby improved, so that the range of service suitability may be correspondingly widened.

MR. STEWART'S NOVEL FORM OF COMBINATION LOCOMOTIVE

As a matter of fact, Mr. Stewart—a devotee of the storage-battery locomotive, experienced in its use, familiar with its limitations, keen for its improvement and quick to recognize practical and practicable advancement in its efficiency—has now in service a new storage-battery locomotive of wholly novel form, with numerous features of construction and operation which tend to obviate the disadvantages of older designs and mark long forward steps toward making the type more broadly useful.

This locomotive was built and furnished by the Goodman Manufacturing Co. and is designated as an articu-



FIGS. 1 AND 2. SHOWING ARTICULATED LOCOMOTIVE IN AN ENTRY AND AT THE SHAFT BOTTOM

or materially reducing his voltage. And what he says has behind it the weight of authority, for he has done considerable rapid and economical development during the past three years, using storage-battery locomotives for gathering and trolley locomotives for main-haulage work.

And while in general the field of usefulness for the storage-battery locomotive is as yet by no means clearly defined, there is no question of its utility in the mind and mine of Superintendent Stewart. Furthermore, although general experience up to the present time does not indicate that the storage-battery locomotive can generally supersede the trolley type for haulage, or the trolley-and-reel type for gathering, nevertheless nothing but storage-battery machines could be furnished to Mr. Stewart for his own use in gathering.

Engineers of the broadest experience seem to agree that the field of particular utility for the storage-battery type of locomotive is now, and will probably continue to be, restricted to special conditions wherein the distinct advantages of wholly independent operation are sufficient, and sufficiently easy of realization, to offset the inherent

lated type—a name naturally suggested by the construction and further justified by the number of particularly advantageous features for which the articulated design is directly responsible.

A storage-battery locomotive is unavoidably heavier than necessary for realization of the tractive effort which can be developed for long operating periods by the battery and the battery-driven motors. Consequently the placing of a battery on a locomotive of substantially standard type, with four wheels, all driven, causes an excess of weight on the drivers and robs the electrical parts of the protection against overload, which is so properly provided by slippage of the wheels in any locomotive of correct design.

Superimposing the battery upon the deck of a locomotive of standard form causes increase of height, which is a feature disadvantageous in many mines for which storage-battery operation is particularly desirable. Such a position of the battery covers the working parts of the machine, thereby interfering with the accessibility. It also raises the center of gravity unduly high.

These fundamental difficulties in use of the standard locomotive form for storage-battery operation are ob-

*608 South Dearborn St., Chicago, Ill.

viated in the articulated construction, which also permits incorporation of several additional features which would be wholly impractical in the other arrangement. That is to say, the articulated locomotive is designed throughout with direct reference to the needs and limitations of storage-battery operation.

THE MECHANICAL FEATURES

The battery in the articulated machine is placed low, on a platform carried by the reachbar between two bogie trucks, each of which has a motor geared to one axle. The other axle is idle and is fitted with relatively small

as easily as a mine car. In fact, the machine as a whole is to be regarded in its track performance as being similar to two coupled mine cars of 3 tons' gross weight each, except that by its better construction and squat proportions it has much greater stability and far less liability to derailment.

In rounding curves, the truck ahead acts like a pilot truck of a railroad locomotive, taking the curves easily and safely. The leading wheels being well in advance of the king pin, the forward end of the battery is started around the turn without shock to track or locomotive, and the whole machine follows with none of the impact

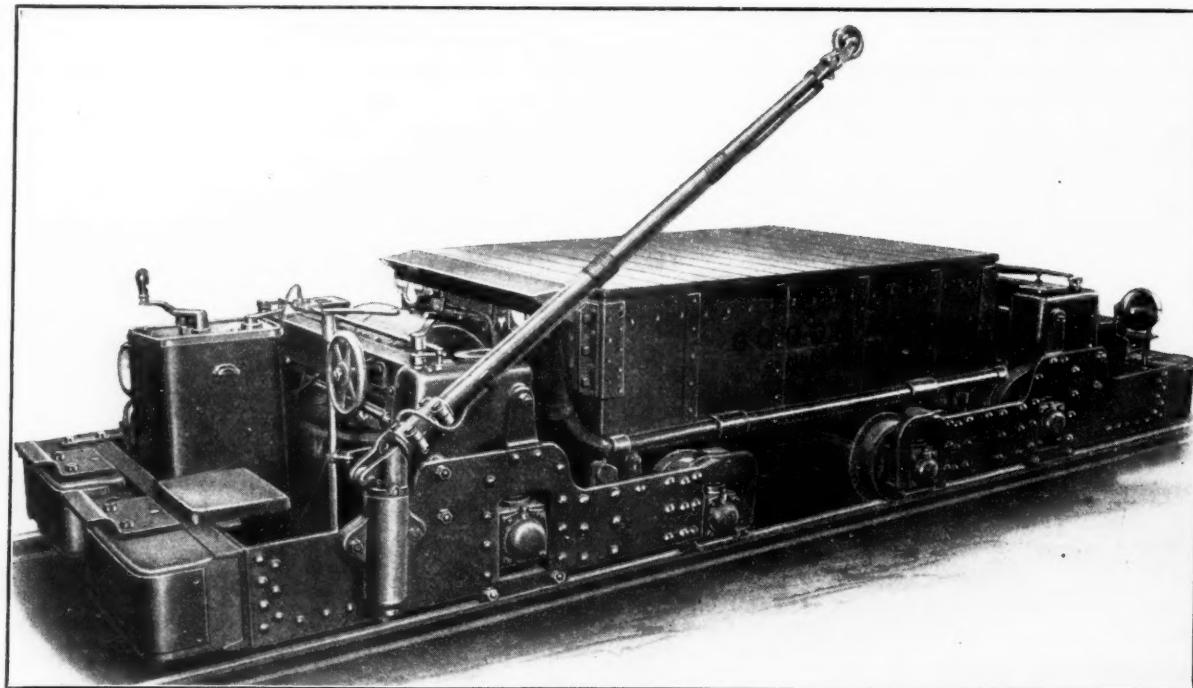


FIG. 3. LOCOMOTIVE WITH TROLLEY ON DRIVER'S END

wheels, which have clearance for swing underneath the battery platform. Thus the locomotive has eight wheels, over which the total weight may be so distributed as to bring more or less than half on the drivers, as may be desirable.

In Mr. Stewart's locomotive the drivers carry somewhat more than half the weight, and as the total is 6 tons there is at the drivers a track pressure of about 4 tons effective for tractive purposes. At 25-per cent. adhesion, this gives a drawbar pull of 2,000 lb. It is easy to provide electric and mechanical equipment to suit this drawbar pull and thereby afford the wheel-slipage protection so desirable in any electric locomotive.

The construction provides space for an adequate battery—375 amp.-hr. in the present instance—without making the locomotive unduly high or interfering with the accessibility of any of the working parts. The available space for the battery is not subject to hampering limitations, since length can be taken as desired, the only effect of increased length of battery box being to spread the distance between the king bolts of the two trucks, and as these are bogies such spreading does not affect the ease of operation on curves.

Its weight carried on eight wheels, the locomotive will run on lighter track than a machine of similar weight on four wheels. Because of the short wheelbase for each bogie truck, the locomotive will turn short radius curves

effects which in four-wheel locomotives mean heavy flange pressures, jerky turns and track troubles.

The articulated construction therefore produces a locomotive which to all operative purposes is as short as a mine car or even shorter. The distance from drawbar pin to driving axle being small, even while providing unusually generous cab spaces for both motorman and trip rider, the drawbar pin is not thrown so far out from the center line of the track in rounding sharp curves nor the corner of the cab so far beyond the outer rail as with a four-wheel locomotive of standard construction. Easy rounding of curves is further facilitated by the ball bearings at the king pins.

The motors and all parts are readily accessible, as they are in no way covered or concealed by the battery. The locomotive is an antifriction machine in all its bearings, and all gears run in oil. Sandboxes are placed high and so give good head for proper flow.

THE ELECTRICAL FEATURES ARE NOVEL

Electrically, the locomotive is equally novel and thorough in design and construction. It is made especially effective and efficient by having split-wound motors and provision for operating by trolley when on the main-haul entries.

The split winding of the motor fields gives two speeds of operation without running on the rheostat, thus con-

serving the battery charge by avoiding waste of power in the resistance on slow runs. Mr. Stewart's locomotive, at its rated drawbar pull of 1,500 lb., will travel $3\frac{1}{2}$ mi. per hr. on the battery and 6 mi. per hr. on the trolley. The split-wound control gives also a slow speed for each method of operation— $2\frac{3}{4}$ mi. per hr. on the battery and $4\frac{3}{4}$ mi. per hr. on the trolley, at full rated drawbar pull and without running on the rheostat.

The advantages of this arrangement are obvious. The locomotive can work at either battery speed while gathering from rooms and entry headings, and then at either of the two higher speeds in hauling gathered trips on the trolley-wired entry to the main haul parting or even all the way to the bottom.

These several running speeds give great flexibility and high economy of operation. The use of the trolley on the longer runs not only conserves the battery charge, but also increases the production by speeding up the delivery of trips to the partings and the return with empties. An ample and adequate controller of full locomotive type is provided, to assure proper reliability in this important feature.

THE LOCOMOTIVE IN OPERATION

Loads are hauled from the face in rooms and entries, but empties are dropped off at the room necks and pushed in by the loaders.

The motorman works alone on the locomotive in entering the rooms for loads. The trip rider remains on the entry to couple up the trip, and then he rides in the front cab as the trip is hauled out the butt entry onto the side entry and thence to the main haulage parting. The trolley pole is placed at his end, where he can readily put it up whenever the trolley wiring is available. It could of course be placed at the motorman's end if desired, as may be seen in Fig. 3.

The articulated trucks are exceptionally free in rounding a curve, and the overall height of the locomotive is small as compared to the loaded cars. Higher types of storage-battery locomotives heretofore used in this mine have necessitated extensive brushing of roof—a costly operation which will be greatly reduced where the Goodman locomotive is operated. This lower machine has been useful in territory to which the older ones could not go.

The roof in many places is irregular in contour and quality, and while not so poor as to make trolley wire maintenance on the entries particularly difficult, Superintendent Stewart certainly avoids possible trouble by not stringing any.

He also has been able to get along with half the generating plant otherwise necessary, as only the main-haulage locomotives have to be served during working shifts, the storage batteries being charged at night.

OTHER REASONS FOR STORAGE-BATTERY MOTORS

Other operators may find various other reasons for the use of storage-battery locomotives. Among them might be mentioned such conditions as the following:

1. Where additional locomotive service is required and the power plant is already loaded. The storage battery, charged at night, may relieve this situation and avoid the necessity for enlarging the power plant.

2. Where large immediate increase of haulage equipment is required, to meet a sudden demand for coal when

time and possibly the temporary character of the demand may not permit or justify enlargement of the power plant.

3. Where the territory served is widely scattered in proportion to the output, making unreasonably expensive the trolley wiring and rail bonding for a regular trolley locomotive.

4. Where, because of gaseous conditions, the mining laws prohibit the use of trolley locomotives on the return air. Under such circumstances a mine already laid out with rooms turned off both entries must have a storage-battery locomotive, or use mules, to serve the back entries on the return airway.

5. Where alternating-current cutting machines are used. Storage batteries may be charged through a rectifier at less expense than for a motor-generator set to drive a trolley locomotive, besides saving the expense of wiring and bonding, which would not be required for nor utilized by the cutting machines.



Electrically Operated Colliery

By B. H. STOCKETT*

Starting Apr. 9, 1913, a new colliery 1 mi. west of Shenandoah, Penn., began its unique life—unique in comparison with the surrounding collieries owing to its being operated by electricity. This was the Weston colliery of the Locust Mountain Coal Co.

The only parts of the plant not operated by electricity are the heating system and six steam shovels on the stripping which are used for removing overburden and loading coal. There is a motor equipment of 1,363 hp. electric, divided as follows:

Breaker—three 100-hp. motors for a main drive, one 20-hp. motor for a conveyor line, one 20-hp. motor for a tail-rope haulage on refuse.

Machine shop—one 20-hp. motor for all machines.

Car hoists—two 35-hp. motors.

Compressors—two 100-hp. motors on a short-belt drive.

Plane hoist—one 50-hp. motor on a letting-down plane.

Fans—two 7.5-15-hp. motors running disk-type fans.

Locomotives—three 80-hp. motors and one 60-hp. motor for haulage.

Pumps—two 10-hp. motors for fresh water to steam shovels, one 50-hp. motor and one 35-hp. motor for wash water.

Miscellaneous—four 5-hp. motors for small hoists used in place of mules, one 3-hp. motor blow for fan in boiler house.

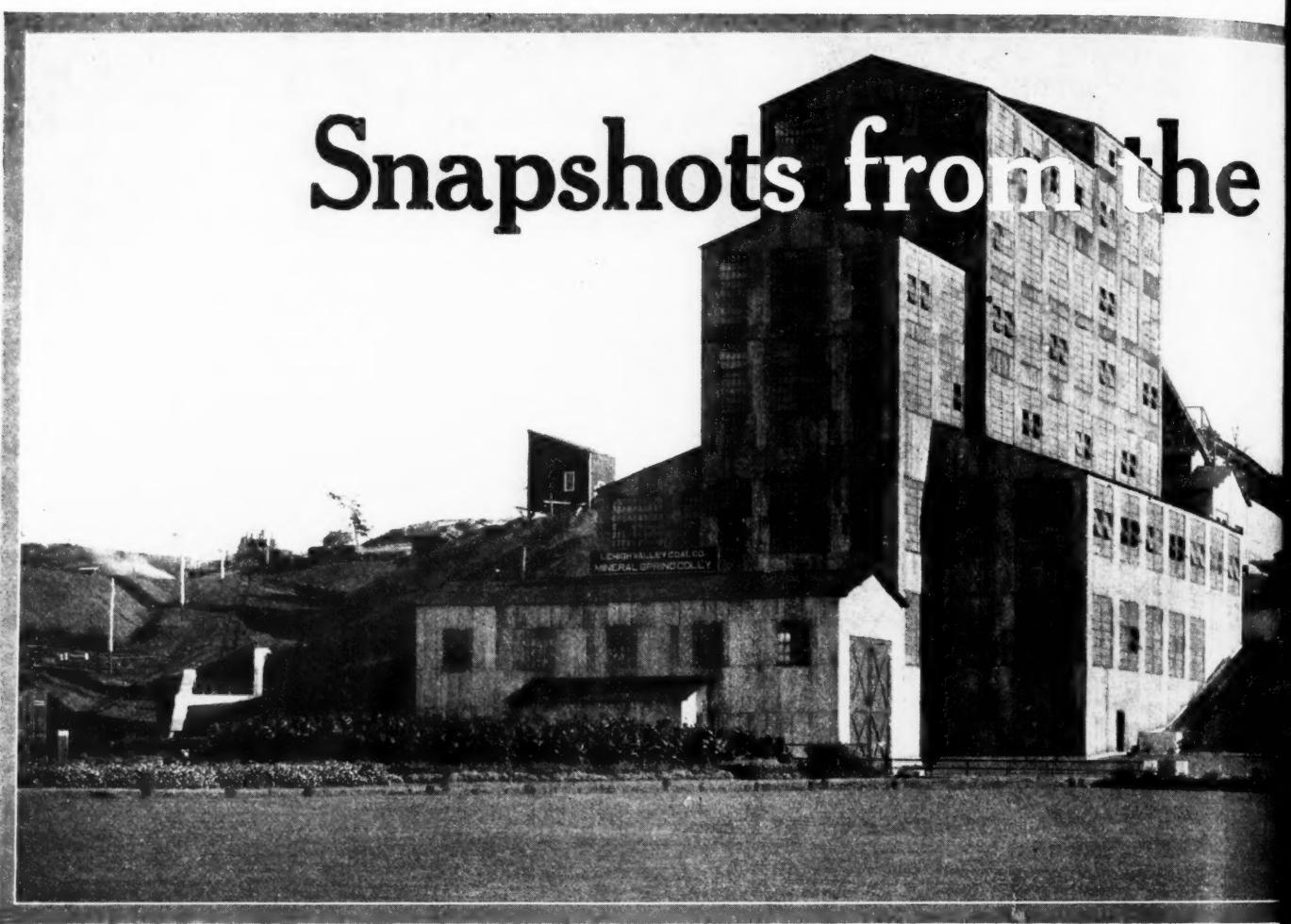
Electric shovel—one 225-hp. motor operating a dragline excavator for stripping purposes.

The company does not own a mule or horse, and everything except actual teaming is done with small hoists and electric locomotives. While in some cases this may seem difficult, it is working out with great success, and all in any way connected with the operation are more than enthusiastic over electricity, both for its ease in operation and its economy.

The power is furnished by the Schuylkill Gas and Electric Co. and is delivered at 4,000 volts alternating current, three phase, 60 cycle. It is then stepped down to 440 volts, which is the regular working voltage. The mine locomotives and some of the inside hoists use 250 volts direct current.

*Shenandoah, Penn.

Snapshots from the C



THE NEW MINERAL SPRING BREAKER OF THE LEHIGH VALLEY COAL CO. AT PARSONS, W. VA.



LEHIGH COAL AND NAVIGATION CO.'S MAMMOTH STRIPPING AT NESQUEHONING, PENN.

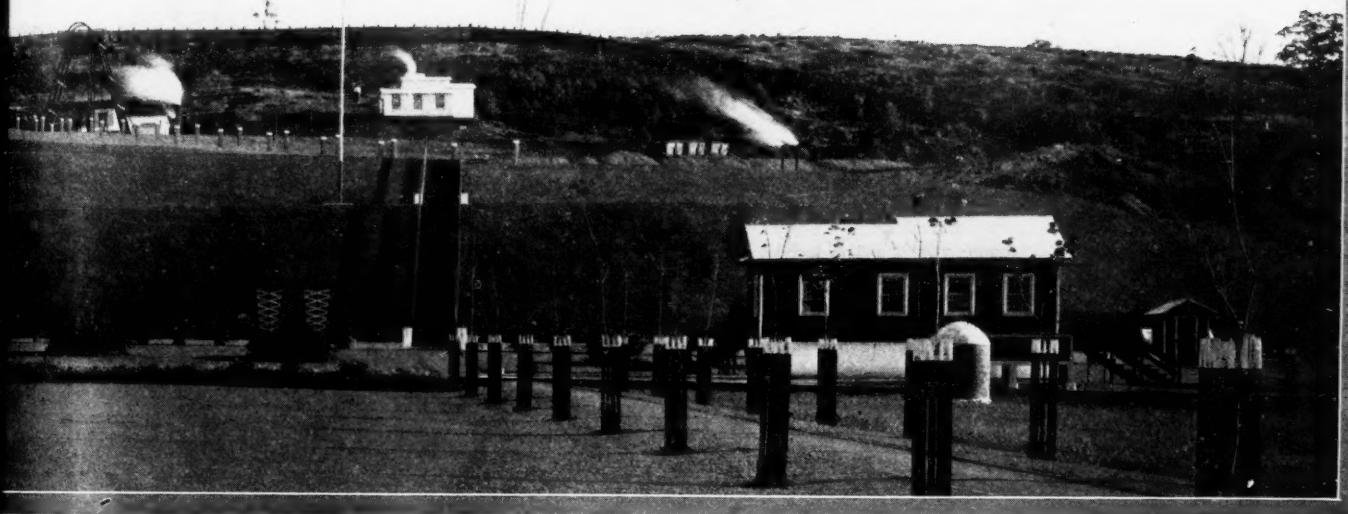


NO. 2 TIPPLE OF WINDING GULF COLLIERY CO. IN W. VA.

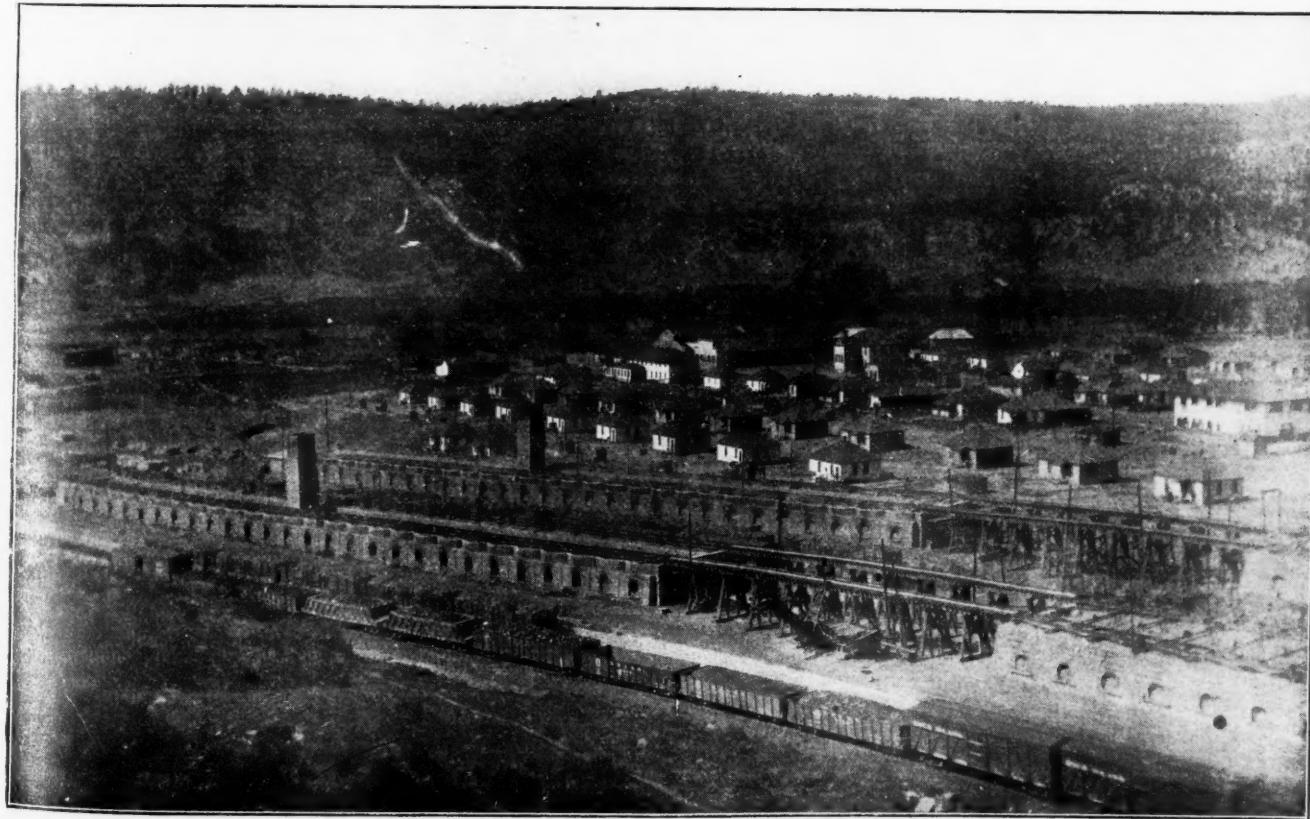


NO. 1 TIPPLE AND POWER HOUSE OF WINDING GULF COLLIERY CO.

Coal-Mining Field



PARSONS, PENN. NOTE THE HIGHLY IMPROVED AND BEAUTIFIED SURROUNDINGS



SOME STAG CAÑON FUEL CO. HOUSES AND COKE OVENS AT DAWSON, N. M.

Combination Gathering Motor

BY F. J. FOLEY*

SYNOPSIS—A locomotive low in height and sufficiently powerful to slip its drivers when operating from the battery has been installed to take the place of the reel type of motor. This machine has now been in successful operation for several months.

Few operations in the production of coal for market offer greater opportunities for trouble or expense than the gathering of loaded cars from the rooms and their delivery to the haulage road. Many systems of transportation have been tried with varying success, but none has entirely satisfied the producer that it combined the necessary qualities of reliability, economy and safety.

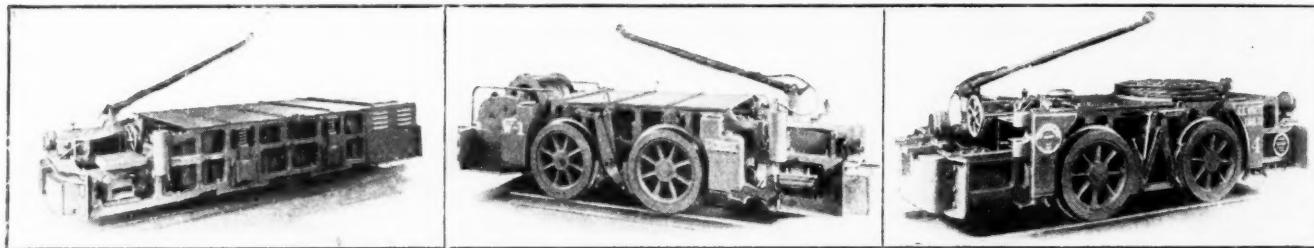
In the earlier stages of mining in various parts of the world, humans—sometimes men, often women—dragged or carried the coal out in baskets. Later various animals such as horses, mules, oxen and even dogs were tried. In the larger operations, however, the cost

aged and the locomotive possibly be put out of commission for several hours. Cable with badly damaged insulation has caused many serious injuries to the locomotive operators and others.

When the storage-battery locomotive was first successfully operated in the metal-mining field many coal men felt that here was a solution of their difficulties. This proved at least partially true for new operations which were developed especially for this class of gathering, but in mines taking cars from several rooms and hauling them 1,000 to 1,500 ft. to the main haulage road against severe grades the battery locomotive was not economical. Furthermore it was found difficult to keep the height of a storage-battery locomotive down to the proper amount for a mine with a 3-ft. coal bed.

THE COMBINATION LOCOMOTIVE DEVELOPED

The best solution appeared to be to combine the good features of both types of locomotives; that is, to construct a machine using the battery for proceeding into the rooms



FIGS. 1, 2 AND 3. SHOWING COMBINATION AND THE HORIZONTAL AND VERTICAL REEL TYPES OF LOCOMOTIVES

of transportation by these means was found to be excessive. While the mule has done and is still doing good work in this field, these animals are expensive, their lives underground are short, they are easily injured and must be fed regularly. Furthermore damage suits from accidents caused by vicious mules have been a source of considerable expense.

LOCOMOTIVE IS MORE ECONOMICAL

The reel type of gathering locomotive has supplanted the animal in popular favor and has been found to be much less expensive, more reliable and safer, but in many instances this machine has serious drawbacks. There are few operators using this type of gathering locomotive who are not looking for something cheaper, more reliable and less dangerous. The gathering reel has solved many of the old problems, but is still possessed of many features that admit of improvement.

The use of a reel locomotive means overhead-trolley construction up to within about 500 ft. of the working face. Furthermore the track must be bonded unless double conductor cable is used. Such a cable is an item of considerable expense.

Conductor cable is easily damaged, and the cost per locomotive is from \$40 to \$60 for a 500-ft. cable. The life of such a conductor is not long—in severe service it may not be over one month. There is also the disadvantage that no one knows when this conductor will be dam-

for the individual cars and the trolley for hauling the small trips to the parting. This type of machine has been developed and is now operating quite successfully.

In order to convey a good idea of this type of locomotive, a description will here be given of a machine that has been operating for several months at the Keeokee mine of the Stonega Coke and Coal Co., of Big Stone Gap, Va.

Recently this company changed management, and simultaneously changed its operation to central-station power, taking current from the Kentucky Utilities Co. Old methods and equipment are now being discarded and replaced with the most up-to-date and efficient methods obtainable.

Local conditions in these mines made the reel locomotive expensive, since the rooms were driven 300 ft. long 50 to 75 ft. on centers. Cross-entries are 2,500 to 3,100 ft. long. The cars weigh 7,700 lb. loaded and 2,000 lb. empty. The trolley locomotive formerly used hauled trips of five cars up a steep grade 300 ft. long. It was also capable of starting a train of four loaded cars on the same grade.

Troubles from failure of the cable, etc., had been frequent at this mine, and the combination locomotive was decided on as the remedy. The following specifications cover the machines now in use: Weight in working order, 6 tons; gage, 3 ft. 8 in.; wheelbase, 3 ft. 9 in.; height to top of frame, 29½ in.; height over all exclusive of trolley, 30 in.; length over all exclusive of bumper blocks, 13 ft. 6 in.; steel-tired wheels, 24-in.

*Pittsburgh, Penn.

diameter, $3\frac{1}{2}$ -in. tread, with 1×1 -in. flanges; width of locomotive over all, $67\frac{1}{4}$ in., the frames are outside of the wheels.

Mechanically the locomotive is exactly the same as a standard trolley type with "Barsteel" frames, M. C. B. brake shoes and an automatically locking screw type of brake mechanism.

STANDARD MOTOR EQUIPMENT IS USED

The motor equipment is also identical with that used on standard locomotives, being two 28-hp. commutating-pole motors equipped with ball bearings. These motors known as No. 904-C are connected to the axles by single-reduction gearing, consisting of one split cast-steel gear

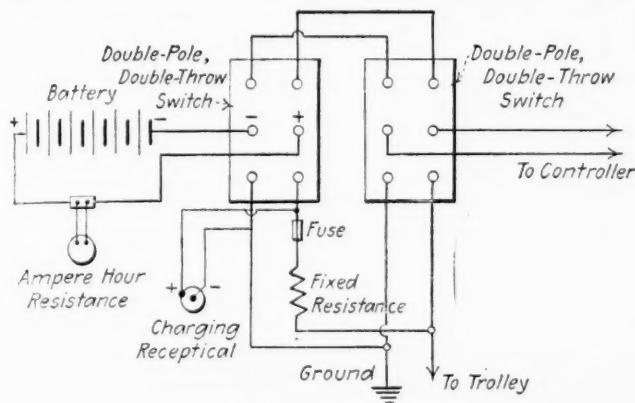


FIG. 4. CONNECTIONS BETWEEN TROLLEY AND STORAGE BATTERY

and a special-process steel pinion keyed to the motor shaft. These gears are inclosed in a split case of malleable iron which is both grease-tight and dust-proof. The battery has 48 type 9-MV Ironclad Exide cells as manufactured by the Electric Storage Battery Co., of Philadelphia, Penn. These cells have a normal capacity of $128\frac{1}{2}$ amp.-hr., or 12.1 kw.-hr. The normal rate of discharge is 25.9 amp. for 5 hr.

The battery is arranged in trays so that it may be readily removed. The trays are assembled in steel battery compartments located below the top and between the side frames of the locomotive. The compartments are supported by rolled steel foot plates and cross-members, a weatherproof cover being provided over the battery compartments. The major portion of the battery is at the rear end of the locomotive, the remainder being in front.

The locomotive is designed so that it may be operated from the trolley alone, from the battery alone or from the trolley with the battery being charged. To accomplish these changes two double-pole double-throw switches have been provided to change the connections from the trolley to the battery and vice versa. In addition provision is made so that the battery may be charged at night when the locomotive is not in service. As may be readily seen from the accompanying diagram of connections, these changes may be made almost instantly, so that no delay is occasioned in changing from battery to trolley or the reverse.

TWO SPEEDS ARE ATTAINABLE

Operating from the trolley, the locomotive has a speed of 6 mi. per hr. with a clean, dry rail and a rated voltage of 250 at the trolley. The speed when operating from the

battery is 1.3 mi. per hr. based on the average discharge voltage of the accumulator. The starting drawbar pull using sand is 3,600 to 4,000 lb., depending of course on track conditions. The battery is capable of slipping the wheels.

With 30-per cent. adhesion, corresponding to a tractive effort of 3,600 lb., the battery will operate the locomotive at 1 mi. per hr. upon its average discharge voltage, or at 0.6 mi. per hr. with its final voltage.

When working at the one-hour rating of the motor, the locomotive will exert a drawbar pull of 3,350 lb. at either 5.6 mi. per hr. from the 250-volt trolley, or at 1 mi. per hr. from the average voltage of the battery. When exerting a drawbar pull of 1,000 lb., the machine will develop a speed of $8\frac{1}{2}$ mi. per hr. from the 250-volt trolley, or $2\frac{3}{4}$ mi. per hr. when operating from the battery at average discharge voltage.

THE ADVANTAGES AND DISADVANTAGES

A comparison of the advantages and disadvantages of the combination trolley and storage-battery locomotive is interesting. The advantages are approximately as follows: No track bonding in rooms or butt entries; no overhead trolley construction in rooms; or cable reels; no cable maintenance; no possibility of injury to employees from defective insulation; the ability to pull cars to and from the rooms when the trolley voltage fails; also the ability to run out of the mine even when the current is off from the trolley.

The disadvantages may be summarized as follows: The necessity of provision for charging the battery; a renewal of the battery every two or three years; a slightly higher first cost for the combination machine; the cost of charging the battery.

It would appear from the foregoing that the disadvantages are far outweighed by the advantages, particularly when it is considered that the extra cost of charging the battery over the extent of using the power directly in the motor is but a small percentage of the total cost of power.

In this connection it is interesting to note that the Westinghouse Electric and Manufacturing Co., builder of the machine described, was recently awarded a gold medal at the Panama-Pacific International Exposition for the general excellence of the locomotive of this type which it exhibited. This would appear indicative of the place which the judges consider is open for these combination locomotives.

E

Operator's Liability for Certified Miner's Negligence— Plaintiff, a laborer in a Pennsylvania anthracite mine, was directed by his superior, a certified miner, to break up a large rock which had been thrown out. This direction was given after the miner had inspected the place and in assuring plaintiff that there were no unexploded shots in the rock. In attempting to break the rock, plaintiff exploded a cap or a quantity of dynamite and was blinded. He sued the employing operator in a New York court, which in upholding his right to recover says: "I think that the presence of dynamite or a cap which, like dynamite, would explode from concussion in a place where a workman is directed to strike with a steel tool is evidence of negligence in setting him at work there in that way." Operators are exempt from liability for negligence of certified mine officials only so far as the carelessness relates to acts within the scope of statutory duties of such officials; so far as an official acts beyond these duties he is the representative of the operator, who is liable for resulting injury to employees. (New York Supreme Court, New York County Trial Term, Martinkovics vs. Lehigh Coal & Navigation Co., 154 New York Supplement, 178.)

Extracts from a Superintendent's Diary

Our prize first-aid team is in disgrace. They went to the "state-wide contest" to represent us and returned home without even notifying the judges that they were in town.

Yesterday they started off bright and early, all dressed in spotless overalls to take the first train into the city (they were afraid that dressing rooms would not be provided at the grounds so they decided to take no chances), and today they returned still conspicuous because of the overalls, but the desire to let their fellow townsmen see them on parade had entirely vanished.

The "patient" of the team (Jim Harper) made the first false step in the ill-starred adventure. He accepted an invitation to take a drink with a former resident whom he happened to meet almost as soon as he arrived in the city, and from that time on he forgot what he had come for and soon slipped the collar. His team-mates, fearing that he would feel his importance too much, had led him to believe the night before that anyone could act as "patient," so he had not left camp bristling with his own importance as had the other five members of the party, and it is not surprising that a few drinks made him forget entirely the main adventure of the day.

When the others realized that the "patient" had wandered off, they roamed about town in search of him and soon found themselves in parts of the city where men dressed in overalls and miners' caps attracted more than passing notice. Soon a motley crowd of street urchins collected at their heels hooting at them and subjecting them to a torrent of sarcastic remarks.

The men took it all with good grace for a time, but finally the remarks became too personal, and Sandy McArthur, captain of the team, lost his temper and, turning about, waded into his tormentors and gave them something to howl about.

The street became alive with patients needing first-aid treatment, but the first-aid squad overlooked its opportunity completely and stood silently by, while its captain inaugurated a reign of terror.

About this time an officer of the law chanced upon the scene and, realizing at a glance the seriousness of the crisis, rushed to the nearest alarm box and sent in a riot call.

Just what happened immediately after the arrival of the police reserves must remain a matter of conjecture until we can obtain evidence not now available. Several hours later the chief of police managed to reach me on long-distance telephone, and I succeeded in getting the team members released on bail, but the information that he gave me does not exactly tally with the narrative of our men, so I have decided to reserve judgment.

By the time the men were released from custody, only a few minutes remained until the time for the first-aid meet to begin, so the chief, realizing their predicament, kindly offered to send them to the field in the police patrol auto, and they accepted his invitation.

But in that, Fate again willed otherwise. Hardly had the automobile started on its journey when in turning a corner it collided with two men, one of whom proved to be the traitorous "patient." When the occupants of the auto got to him he was in need of all of the first-

aid talent they possessed, and instead of continuing the journey to the first-aid meet, they were compelled to hurry to a hospital.

Jim's wife was at the station to meet him today when the train rolled in, much to his dismay, and judging by the conversation that drifted back over the hill long after Jim and his wife had faded from sight, Jim may require further first-aid treatment from his team-mates before today's adventure is entirely forgotten.

3

Illinois Mining Institute

SPECIAL CORRESPONDENCE

The Illinois Mining Institute held its third annual meeting in the City Hall, Springfield, Ill., Saturday, Nov. 20, beginning at 9:30 a.m. Mayor Baumann welcomed the institute to the city, and the president of the association, J. W. Stark, state mine inspector, of Georgetown, replied and also welcomed the members.

State Mine Inspector David Z. Thrush read a paper upon the topic, "The Mine Manager," which brought out so much discussion at the morning session that upon the request of a number of members who came in during the discussion but after the reading of the paper, it was also read at the afternoon session. Those who took part in the discussion that followed were Thomas Moses, general superintendent, Bunsen Coal Co., Westville; John P. Reese, of the Superior Coal Co., Gillespie; Mr. Burton, of Herrin, a board member of the U. M. W. A.; Mr. Patrick Hogan, and the newly elected president of the institute.

Mr. Burton started the discussion and urged the advisability of getting greater efficiency from the men at the face, saying that in his opinion too much attention is now given to improving the efficiency of company and surface men. Mr. Reese and others held that at present miners are content to earn a less daily wage than they are capable of earning with greater exertion, and that it is difficult to increase the general efficiency of the mine by increasing the output per man beyond this moderate wage. Though different machine loaders have certain rate advantages enabling them to make better wages under certain conditions than other loaders, most of the loaders seem satisfied to make the same average wage and cannot be forced to increase their earning power. It was also claimed that men working three days per week produce more per day than those working six days, and some argued that the six-days-per-week men should increase their daily average to the same amount as the three-days-per-week men. Others opposed this proposition and argued that a man always works harder for part time than if working steadily. This friendly discussion between prominent operators and officials of the miners was most interesting and illustrated the good effects of the mining institute.

The director of the State Geological Survey, F. W. De Wolf, read a paper entitled "Relation of Oil and Gas Wells to Coal Properties," and showed by illustrations several methods proposed by a committee of geologists, engineers and mining men for plugging oil and gas wells that penetrate coal measures. John P. Reese gave an interesting account of the controversy now in progress in the Staunton district of Illinois, caused by the discovery within the past year of oil and gas wells in territory where coal mines are now operating or are projected in the near future.

At the afternoon session, after the rereading of Mr. Thrush's paper, an address entitled "Cleanliness and Order at Coal Mines," by G. E. Lyman, mining engineer of the Madison Coal Corporation, was read by the secretary in the absence of the author. The great waste at many mines owing to disorder was pointed out, the economy of greater order was shown, and also the income available by selling the large amount of scrap that usually is found about mine works. The ideas advanced by Mr. Lyman seemed to be heartily indorsed by a number of speakers.

The following officers were elected for the ensuing year: President, Mr. Burton, of Herrin; first vice-president, Mr. Fehler, of Belleville; second vice-president, Patrick Hogan, of Canton; secretary and treasurer, Martin Bolt, Springfield; executive committee, Messrs. McClintonck, Stark, Reese, Simpson and Bolander.

The City of Herrin in southern Illinois was chosen as the place for the next meeting after a spirited contest between Herrin and Duquoin. The president appointed as an auditing committee, Messrs. Fehler, Hogan and Stoek. At the banquet held at the St. Nicholas Hotel at 6:30 p.m., John P. Reese, of Gillespie, acted as toastmaster. The program included toasts by Messrs. David Ross, Bolander, Stark and others and songs by Mr. Hogan.

X

Pages from a Miner's Notebook: Caste and Cleanliness

I moved next door to the tipple boss recently. He is one of the men employed here who advised me not to join the bathhouse club. "Only the rough-necks wash there," he said.

He came home from work tonight. Behind him came a crowd of the rough-necks. They stopped at the bathhouse, which is a model of cleanliness and convenience, and in a few moments were on their way to their homes, washed, dressed in clean clothes and with their pit clothes hung high up to the ceiling in a good draft of air where by morning they will be dry and well freed from the dampness incident to perspiration.

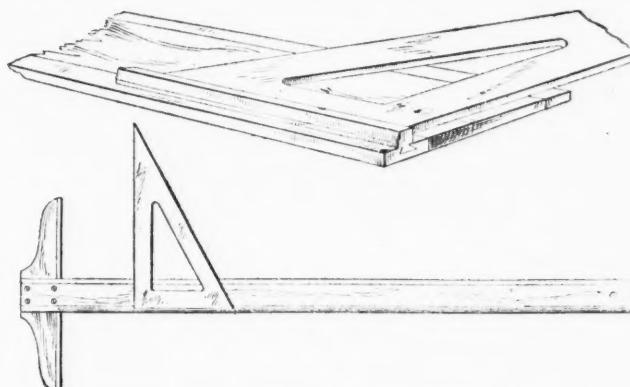
The tipple boss sat on his front steps in his pit clothes, without even washing his hands and face, until long after the roughest rough-neck was comfortably ensconced on his own front porch or busily engaged in his garden. He sat there until his wife called supper, when there was a great rushing about to get into clean clothes. His pit clothes were piled in a corner on the back porch, and he washed hastily in a tub of water which his wife had been forced to draw for him during the heat of the afternoon. Supper was cold and his wife was aggrieved at being kept waiting, which is no wonder, according to my wife.

The clearing away of the table and washing of dishes was late, naturally, and while the rough-necks and their families were on their way to the moving picture show the tipple boss sat waiting for his belated wife, blaming her all the while for being so extremely slow in finishing up the housework.

I wondered at the time just what satisfaction the tipple boss secured from that exclusiveness which prevented his taking his evening bath in the same room or possibly under the same shower as the rough-neck, and I am still wondering.

Device for Inking Over Freshly Drawn Lines

A T-square with three working edges on the bar has recently been patented by E. R. Ruehle & Co., 119 Fulton St., New York City. The third edge is furnished by a stop along the bar. By means of this addition the drafts-



T-SQUARE FOR INKING OVER FRESH LINES

man's triangle can be slid along the board, but held clear of the tracing, so that additional ink lines can be placed on a drawing without waiting for any fresh lines beneath to dry.—*Engineering and Mining Journal*.

X

Ravensdale, Wash., Disaster

The worst coal-mining disaster which ever happened in the State of Washington occurred on Nov. 16 at the Ravensdale mine of the Pacific Coast Coal Co., lessors from the Northwestern Improvement Co., a subsidiary of the Northern Pacific Ry. Co., when an explosion the cause of which is yet unknown killed 31 miners working in the third level. Three miners working in the second level were rescued. The shaft, which descends to the mine at an angle of 60 deg., was completely choked by débris between the second and third levels, but by using an auxiliary slope, rescue crews were able to penetrate several hundred feet along the third level. The ventilating shaft and fanhouse were undamaged by the explosion, and this fact permitted the rapid clearing of the air, thus enabling the rescue teams, which came from practically every mine in the district, to do rapid work.

Following his inspection of the mine, State Mine Inspector Bagley stated that so far as he was able to penetrate the auxiliary slope he had not discovered the center of force of the explosion. The mine, he said, was one of the best equipped in the state for the protection of the men working in it. He has visited the property on numerous occasions, the last time being less than a month ago, "and at all times found it meeting every requirement and better provided than the state law required." It was equipped with a sprinkler system, and the third level had been sprinkled on the Sunday preceding the explosion.

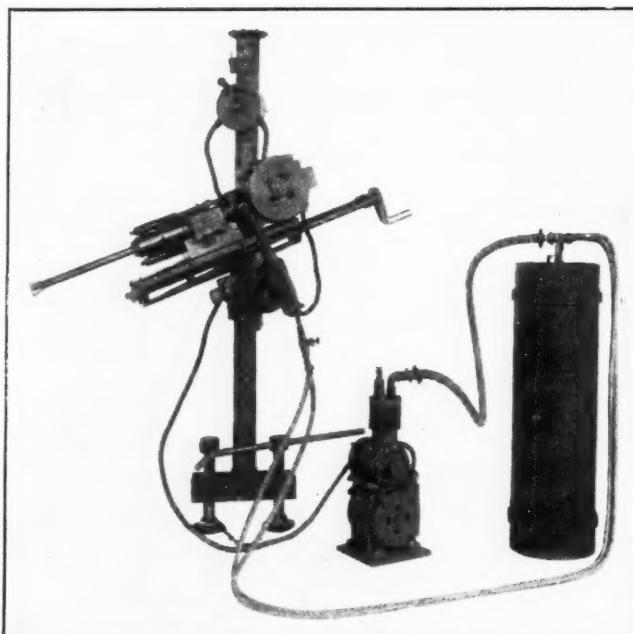
It has been fairly well established that the explosion occurred in the third level east entry. The east and west entries of the third level lie at right angles with the main slope at its bottom. The first is 2,850 ft. long and the second about 2,600 ft. long. The majority of the miners were working in the east entry drawing pillars within 400 ft. of the main slope. It was stated by a miner, who quit early, that the miners drawing pillars fired their own shots and perhaps one of these was poorly placed.

New Apparatus and Equipment

Denver Electric Rock Drill

After several years of practical demonstration, the Denver Rock Drill Manufacturing Co., Eighteenth and Blake Sts., Denver, Colo., has finally put upon the market under strong guarantee a new electrically operated rock-drilling machine. This drill has been built upon principles that have been found thoroughly practical.

The new drills are made in two sizes—one of 2 hp. and one of 4 hp. The structural features in both are identical. The machine is a self-contained, direct-connected unit.



DENVER ELECTRIC ROCK DRILL AND AUXILIARIES

The equipment also includes a small auxiliary electrically driven air compressor and an ordinary drill-water tank. Neither compressor nor tank, however, is essential to the operation of the drill proper, but is needed only in the cleaning of the drill hole and in supplying water for drilling.

Each unit is built as light as is compatible with durability and is designed for muleback or horseback transportation when necessary. The claims made by the manufacturers for this drill are its endurance, its drilling speed, its freedom from "fitchering," or sticking, and its low power consumption. It is free from all freezing troubles, and the cost of a complete installation is comparatively small. This renders it particularly suited to remote mining localities where fuel is expensive.

As may be seen in the illustration, the drill motor is mounted behind the drill mechanism proper. It is compact and fully inclosed against dirt and moisture, as well as shock. The coils of the motor are made into compact, solid units, with insulation baked on, thus rendering the coils secure against deterioration from vibration. The motor shaft runs in ball bearings, and the power is delivered to the drill mechanism through an in-

ternal reduction gear. The machines are built to operate on three-phase 60-cycle alternating current of 110, 220 or 440 volts' tension. There are consequently no brushes or sliding contacts.

The main portion of the drill comprises two cylinders mounted side by side. One of these contains a piston serving as the pulsator, which is driven by a connecting-rod from the motor gears. This pulsator compresses air in both ends of this cylinder and forces it back and forth into the corresponding ends of the hammer cylinder, where it causes the latter to oscillate with the pulsations of air.

The hammer has a 4-in. travel. As the air is not exhausted from these cylinders, but is drawn back and forth repeatedly, being alternately subjected to compression and suction, it does not become heated, and hence no cooling arrangements are necessary. The pulsator cylinder is provided with a bypass valve, by means of which the operator may instantly cause the pulsations of air to take place between opposite ends of the pulsator cylinder, thus stopping the hammer, or he may adjust the blow of the hammer to any desired intensity.

The drill strikes about 1,200 blows per minute, and the regulation of cutting speed is entirely by means of the bypass valve. It is not necessary, owing to this bypass, to shut off the current in order to interrupt the action of the machine.

Rotation of the drill steel is accomplished by a ratchet and slip-friction set of gears, driven directly from the motor. The steel therefore turns when the hammer is stopped, and in this condition the machine may be used as a boring tool. The steel employed is round and hollow. A portion of the shank about an inch long is swaged square to fit the socket of the drill. The quantities of air and water admitted to the steel are governed independently by valves. The feed is by means of the ordinary shell and screw mechanism. Lubrication of the drill is positive and simple. It is practically impossible to lose a drill hole with this machine.

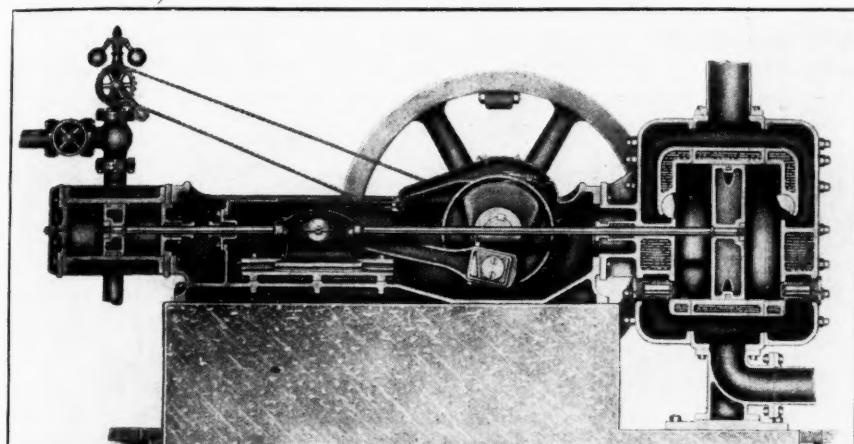
The electric switch governing the machine is constructed shock-proof. Movement of the handle to the first notch starts the compressor running, while movement to the second notch throws the drill motor into action.

* * *

A New Vacuum Pump

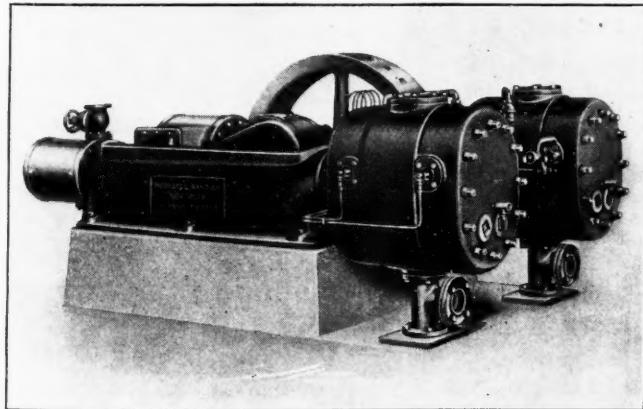
The degree of advantage obtained from the use of condensing apparatus is dependent upon the vacuum maintained. For the purpose of securing and maintaining a high vacuum, the Ingersoll-Rand Co., 11 Broadway, New York, has recently introduced a line of steam- and power-driven duplex-type Imperial vacuum pumps.

Differing front the usual design of such machines, the intake valves in the vacuum cylinders of these pumps are of the corliss type and so placed in the cylinder head that the clearance is extremely small. This is a desirable feature in that air trapped in the clearance space



SECTION THROUGH IMPERIAL VACUUM PUMP

at discharge pressure will not reach such a volume upon expanding to intake pressure as to greatly limit the pressure reduction which may be obtained. The action of this valve is positive and rapid, being independent of the cylinder and intake pressures. The intake ports are large and direct. This, together with the water-jacketing of the valve, tends to cool the intake gases. The discharge valves are of the direct-lift poppet type and are placed in the bottom of the cylinder heads so that any entrained moisture or water is immediately discharged. Clearance at the point of discharge has been reduced by making the valve partially fill the port in the cylinder head. The discharge passages are also water-jacketed. The low clearance space in these vacuum pumps has been obtained, not by permitting the piston to come into dangerously close proximity to the cylinder head, but by a careful design of the valves and valve ports. Owing to the extremely low clearance, the complete water-jacket-



DUPLEX IMPERIAL VACUUM PUMP

ing, the corliss inlet valve and other refinements of design, the manufacturer guarantees the easy maintenance of a vacuum within $1\frac{1}{2}$ in. of the barometer.

Lubrication of these machines is by the bath system, providing flood lubrication, yet retaining by the removal of covers from the casing a high degree of accessibility. When in operation the flywheel is practically the only visible moving part, yet the entire mechanism is readily accessible while in motion.

In reality a duplex machine, such as this, is two identical units of like capacity united by a common frame and a shaft with two cranks at 90 deg. from each other. This

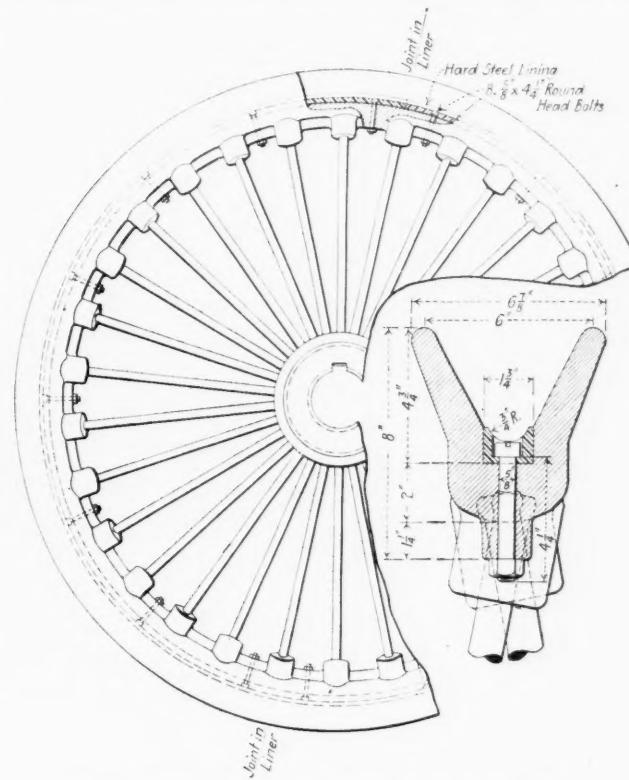
makes it possible, should requirements fall temporarily below that for which the machine was originally installed, to remove one connecting-rod and continue operation with one-half of the machine idle, while the other half of course works at its utmost efficiency, but removes only one-half of the air and vapor handled by the entire machine.

These machines are built in capacities from 795 to 7,048 cu.ft. per min., both for atmospheric and low-pressure discharge. It is claimed by the manufacturer that these pumps operate practically independently of attention and are thoroughly efficient and economical machines for maintaining a high vacuum in practically any type of condenser.

X

A New Type of Sheave

It is almost the universal practice at coal-mine shafts to lead the cables from the hoisting cages over sheaves on the headframe and thence to the drums of the hoist. The cable is thus caused to follow and bend around the rim of the sheave for a distance of almost 180 deg. As a result of this bending and the consequent slight slipping



NEW SHEAVE WITH RENEWABLE LINING

and working of the cable strands upon themselves and upon the sheave the wear upon the rim of this wheel is considerable.

To lessen the wear upon the sheave rim as well as to render easy repairs thereto possible, the Litchfield Foundry and Machine Co., Litchfield, Ill., is offering to the coal-mining industry a sheave with a renewable wearing rim of hard steel, as shown in the illustration.

As may be seen, this renewable rim is made in halves, each of which is held in place by eight $5/8 \times 1\frac{1}{4}$ -in. special bolts. It is thus an easy matter to remove a worn liner and replace it with a new one, making the sheave practically as good as at first. With a headframe equipped with sheaves of this type, it should not be necessary to carry an extra sheave as a spare, a pair of sheave liners answering every purpose.

The "Simplate" Valve

To insure higher mechanical and volumetric efficiency and to simplify air-compressor cylinder design, the Chicago Pneumatic Tool Co., 1080 Fisher Building, Chicago, Ill., has recently placed on the market the "Simplate" valve, which is of the flat-plate design. The valve has several distinctive features and the chief advantages claimed for it are that it is simple; that its plates are independent in action, one of another; that each plate has its individual springs; that the tensions of the springs on the inlet and discharge valves differ according to the

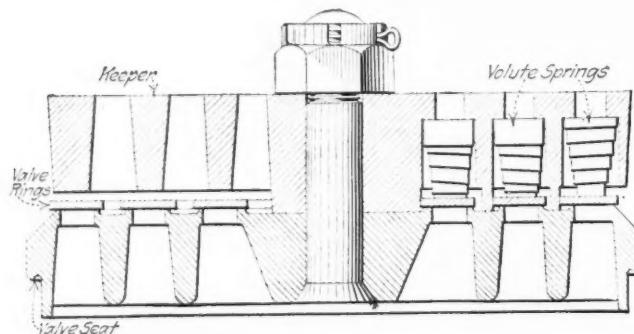


FIG. 1. "SIMPLATE" DISCHARGE VALVE

density of the air handled; and finally, that it is applicable to all positions and conditions.

Fig. 1 shows a section through a discharge valve. The seat is cast from a special alloy steel, heat-treated, oil-tempered and ground true on one side. As shown in the illustration, the seat has circular ports and it is machined so that the raised portion, or the point on which the plates rest forming the joints, is narrow, thus reducing the unbalanced area of the valve. The keeper is of the same material. It is provided with suitable ports for the free passage of the air through it and also furnishes guides for the valve plates and pockets for the valve springs. The latter are of the volute type and are made of high-grade

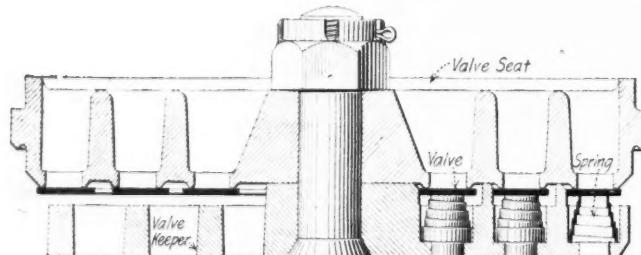


FIG. 2. "SIMPLATE" INLET VALVE

crucible steel. The valves are simple concentric steel plates of uniform section, with a separate and independent plate over each port. Each plate is independently governed by its own spring, hence the action or opening of each valve is entirely independent of the other.

Should one of the plates open, the next one to it does not need to move unless the speed conditions should demand it. Ordinarily the outer plate opens when the compressor is running at slow speed, when running at intermediate speed two plates operate, and at full speed all valves are open. The parts making up a complete valve are assembled and held together by a nickel-steel stud and

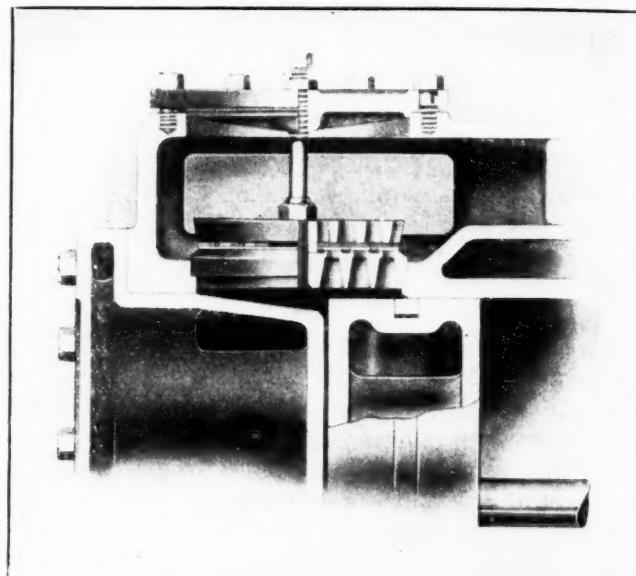


FIG. 3. POSITION OF VALVES IN AIR CYLINDER

castle nut, and when this nut is tightened in place it is held by the cotter pin.

As shown in Fig. 2, the construction of the inlet valve is similar to that of the discharge valve. It differs in that the keeper is thinner and the springs have lighter tension. On account of this difference in thickness, inlet and discharge valves cannot be reversed. The spring tension on the inlet valves is light in order to derive the full benefit of the various openings of the different plates when the piston speed is changed. For example, with an inlet valve of the size shown herewith, the spring tension is so calibrated that the outer plate opens with a

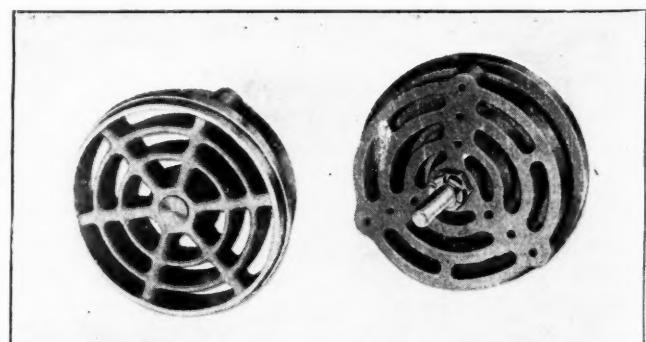


FIG. 4. THE "SIMPLATE" VALVE

pressure of but $\frac{1}{4}$ oz. per sq.in., while 1 oz. will open the intermediate plate and $2\frac{1}{2}$ oz. the inner plate. The valves are said to be noiseless in operation, and their location in the cylinder is convenient for examination or repair, as indicated in Fig. 3. Top and bottom views of the valve are shown in Fig. 4. It is equally suited to high- and low-pressure work and requires no lubrication. A feature worth noting is that all valve parts are interchangeable.

Who's Who in Coal Mining

T. M. Dodson

A number of young men are coming forward and fast filling positions of trust and importance in the anthracite field. Some of them have chosen the coal business as a lifework merely by accident. Others have been bred and born to it, and such a one is Truman Dodson, one of the youngest general managers of hard-coal mines.

Mr. Dodson's forbears were interested in coal mining a long time ago, and the black mineral was introduced to him at an unusually early age. It isn't always that sons of fathers can truthfully be called "chips of the old block," but such an appellation fits "Trot" Dodson, for starting as a most unimportant cog in the organization of the Dodson coal interests, he has won the respect



TRUMAN MONROE DODSON

of all his associates and risen to his present post of authority by giving close attention to the work at hand.

Mr. Dodson was graduated from Lehigh University in 1900. Following the completion of his college training, he was given employment in West Virginia at the mines of the Garrett County Coal Mining Co. and the Monroe Coal Mining Co. at Barnum. These operations received his undivided attention until 1904, affording him a broad experience in the primary essentials of the mining business. Leaving West Virginia, he became manager of the mines of the Weston Coal and Coke Co. and the Osceola Coal and Coke Co. at Osceola Mills, Penn. Here he remained for two years, after which he moved to Morea Colliery, Penn., to become superintendent of the large Morea and Kaska William collieries.

After receiving valuable experience as mine superintendent at Morea, Truman Dodson in 1907 was appointed general manager of all the Weston, Dodson & Co., Inc., coal and mining interests, including the Beaver Brook colliery at Audenried, Penn. The large output and the many important improvements at the Dodson mines in recent years bear witness to the effective management of Mr. Dodson. A large part of his attention at the present

time is being directed to improving the environments of his employees. A new and modern mining village that is now being erected at one of his collieries is an evidence of his interest in sociological work.

"Trot" Dodson is the sort of young man who doesn't need to stretch his imagination to realize that coal mining is a business with aims and ideals other than the payment of dividends and the accumulation of a fat surplus-reserve. He is modern in his ideas, human in his instincts and charitable in his practices—the sort of fellow who can be fair to himself and those he serves without forgetting or overlooking the rights of those who serve him.

Mr. Dodson is a member of the American Institute of Mining Engineers and an enthusiastic alumnus of Lehigh University. He is at present general manager of five large coal companies controlled by the Dodson family and those associated with it in the mining business.

Recent Legal Decisions

Reasonableness of Intrastate Coal Freight Rates—In fixing intrastate freight rates on coal shipments, a state railroad commission may validly use as a basis voluntary intermediate rates established and long maintained by railroad companies. (Kansas Supreme Court, Union Pacific Ry. Co. vs. Public Utilities Commission, 148 Pacific Reporter, 667.)

Operator Not Liable for Independent Contractor's Negligence—Where a mining company employs a contractor to construct a tunnel according to specifications, and he is left free as to the means and methods of doing the work, the company cannot be held responsible for injuries to one of his employees, caused by discharge of a "missed hole" and due to the negligence of the contractor in failing to warn the employee against the danger or to promulgate rules to prevent such accidents. (Utah Supreme Court, Dayton vs. Free, 148 Pacific Reporter, 408.)

Imputed Notice to Corporations—Although a corporation is not chargeable with notice given one of its employees concerning a fact not within the scope of his employment, a company engaged in selling coal is chargeable with notice given its assistant sales agent that defendant would no longer guarantee payment for coal delivered to a third party, where the principal sales agent of the company was absent and the assistant was apparently in charge of the corporation's general offices. (Washington Supreme Court, Canadian Collieries, Ltd., vs. Humphrey, 148 Pacific Reporter, 573.)

Operator's Liability for Gas Explosion—Where a gas explosion in a mine was attributable to negligence of the fireboss in failing to make proper inspection, the operator's liability for injury to a miner is not affected by previous negligence of the miner in failing to pierce an opening through a horseback so that the boss could get through to make inspection, nor by the fact that the day before the accident the injured miner disregarded a warning to stay out until arrival of the fireboss. (Kansas Supreme Court, Oplotnik vs. Cherokee & Pittsburgh Coal and Mining Co., 148 Pacific Reporter, 616.)

COMING MEETINGS

American Society of Mechanical Engineers will hold its annual meeting Dec. 7-10, 1915, New York City. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

Coal Mining Institute of America will hold its winter meeting Dec. 21-23, 1915, at the Fort Pitt Hotel, Pittsburgh, Penn. Secretary, C. L. Fay, Wilkes-Barre, Penn.

Engineers' Society of Western Pennsylvania holds its monthly meeting third Tuesday of each month; section meeting, first Tuesday. Secretary, Elmer K. Hiles, Oliver Building, Pittsburgh, Penn.

Western Society of Engineers, Chicago, Ill., holds its regular meeting first Wednesday of each month, excepting July and August. Secretary, J. H. Warder, 1785 Monadnock Block, Chicago, Ill.

The Labor Situation

SYNOPSIS—Trouble at Lehigh Coal and Navigation Co.'s mines ends. At Maryd, Penn., of the Maryd Coal Co. men all but 12 are at work. The Madeira-Hill Coal Mining Co. and the Rochester & Pittsburgh Coal and Iron Co. have strikes at their mines. In Ohio, J. T. Daniels testifies that the rate from Corning to Toledo is 33c. too high.

For the first time in many weeks the collieries of the Lehigh Coal and Navigation Co. in the Panther Creek Valley have been able to work a whole week without a strike of any kind. The miners working for this company have gone on strike and returned to work without any conference with either the union leaders or the company officials. They appear to stay at home till they are tired and then they go back to the mines.

In Maryd, near Tamaqua, Penn., the miners of the Maryd Coal Co., a subsidiary of J. S. Wentz & Co., have objected to a certain portion of the mines being operated with the aid of safety lamps without the men being remunerated for what they regard as a handicap. At first the men all went on strike, but this method of attack seemed more grievous to the miners than to the company, and the employees have now made up their minds to return to work, but to pay the living expenses of the 12 men whose work would normally be in the safety-light zone, but who by orders of the miners and their own inclination are now idle.

The employees working for the Madeira-Hill Coal Mining Co. allege that the company is violating the 1912 agreement for certain kinds of underground work. So 800 men and boys went on strike at the Stanton colliery on Nov. 23. The officials of the United Mine Workers are endeavoring to effect a settlement. Of course, such a strike is in violation of the ruling of the arbitration commission.

Want Higher Wages in Central Pennsylvania

The members of the United Mine Workers of America employed at the Rochester & Pittsburgh Coal and Iron Co.'s mine at Adrian (post office Delancey), Jefferson County, Penn., went on strike on Nov. 20, and the miners at the Florence mine of the same company laid down their tools in sympathy. The loaders want 45c. instead of 37.5c. per ton for loading coal and a day instead of a ton scale in the headings. The miners ask for \$3.30 per day in wet headings and \$2.64 where these places are dry.

The company has informed the miners that a strike is a violation of the agreement. A strike for increased wages is particularly discreditable to the organization, seeing that the contract provides for the maintenance of the scale till April 1, 1916.

It should be stated, however, that the miners claim that the headings in Adrian had become abnormal and that a new scale should be provided to meet the new condition. James Marks, a board member of district No. 2, says that the Florence strike was not in sympathy with that at Adrian, but that the miners struck because the company was violating the contract in every particular. About 700 men in all are affected.

At the Florence mine near Martins Ferry, Ohio, operated by the Youghiogheny & Ohio Coal Co., it is stated that the mine foreman asked four men to work 5 min. after quitting time, using unprintable language when the men failed to acquiesce. The foreman was attacked by two or more men, and as a result a trip-trider and three electric locomotive men were discharged. As a result 350 men went on strike in violation of their contract by which striking is forbidden.

The labor situation in Ohio and West Virginia still centers round the uncertain freight-rate question. The West Virginia people somewhat generally believe that the firm stand of the Chesapeake & Ohio Ry. in demanding an increase in western Pennsylvania rates as large as the increase in Ohio rates has made Pennsylvania and West Virginia a unit in demanding a maintenance of the present freight rates. They regard the action as quite shrewd and feel assured that the final rates will give Ohio only a trifling advantage in the market and Pennsylvania none at all, but rather an inferior position.

It now develops that coal shippers, who expected to get refunds from the Hocking Valley Ry. Co. for the difference between the old and the new rates, which amounts to 15c. per

ton, will have much to do before they are reimbursed in full. The railroad company is now litigating its liability for the refund in question.

The Hocking Valley Ry. Co., in July, 1911, sought by a suit to stop the enforcement of an order which had been made by the Public Service Commission of Ohio. The company lost the suit in September, 1915, and the rate was cut from \$1 to 85c. Shippers have been expecting a refund of the 15c. overcharge. Not all the claims have been filed, but coal men have estimated that they would aggregate about \$200,000.

When the litigation was opened, the court hearing the case required bonds to be filed by the company to protect shippers in case the rate was found to be too high, and as a result the company was bonded in the aggregate sum of \$33,000. The position and claim of the company was made plain in an answer filed with the utilities commission, in which it held that its financial liability for refund to shippers was limited to the security which the court had required. It took the position that if the claims exceeded the bonds the money could be prorated among the claimants.

The company took this position in an answer to a claim of \$264 made by T. E. McElfresh, of Delaware. It asked for the dismissal of the suit by the commission for lack of jurisdiction and set forth that the whole matter was a piece of litigation in the courts and that the bonds were given under court orders. The bonds were not and never were under the direction or control of the commission. The claimants, the road's counsel contends, must go to the courts.

Under the law any rate judicially determined is to be the just and legal tariff for one year. The question is to be brought up if the claims may be filed for the entire period of the litigation or only for the year during which the rate is free from legal attack. That is still another limitation that may be urged against the claimants for refund.

The coal-rate case ending before the Ohio Utilities Commission which is being prosecuted by the Sunday Creek Coal Co. and the United Mine Workers of America in Ohio was resumed last week after a long recess which was allowed so that the evidence given might be tabulated. It was disclosed in the hearing that the defendant railroads, the Hocking Valley Ry. and the Toledo & Ohio Central Ry., will take at least a week in the defense and probably longer. The case will be bitterly fought on both sides and the recent action of railroads in Middle West territory will have no bearing on the prosecution of the case. The complainants rested their case Nov. 23, although they will probably call witnesses in rebuttal.

Rates Should Be Lowered 33c. per Ton

The first witness to take the stand after the three weeks' recess was W. M. Hopkins, of Chicago, the rate expert retained by the Sunday Creek Coal Co. He was reexamined as to the exhibits he had prepared to show the alleged injustice of the present 85c. rate on the Hocking Valley Ry. from the Nelsonville assembling yards to Toledo. His testimony on these documents closed the Sunday Creek case against this defendant. The witness was continued on the stand, however, to explain exhibits he had submitted in the attack upon the rates from Corning to Toledo over the lines of the Toledo & Ohio Central Ry., co-defendant in the case.

A forceful witness was found in J. T. Daniels, of Columbus, former freight-traffic man, but now engaged in rate-expert work. His exhibits were confined to showing what the Corning-Toledo rate would be if based on the same ton-mile charge as rates from various West Virginia, Kentucky and Tennessee fields into Toledo. He had also submitted exhibits in the testimony against the Hocking Valley Ry. The contention of both Hopkins and Daniels was that the Corning-Toledo rate, including assembling and terminal expense, should be about 67c., instead of \$1 as now in force.

Farmers Will Try Accused Colorado Miners

Nearly 100 cases arising out of the rioting in Huerfano County will be transferred to the district court at Castle Rock, Douglas County, Colo. This is the center of a farming, dairying and stock-raising section. The only mining interest is limited to quarrying.

The county lies between Denver and Colorado Springs. The court is presided over by Judge Dennison, who has been appointed to try the cases instead of Judge Hillyer, who was debarred from sitting in judgment in these trials by the Supreme Court of the state. State Attorney Farrar agreed to the change which was requested by Attorney Hawkins, the chief counsel for the United Mine Workers of America.

Editorials

Wake Up!

The anthracite fields have always been conservative. They have been far separated from the bituminous districts in miles and in topography, but much farther in thought and custom. Years ago the bituminous fields became overdeveloped, and the operators were forced to try everything that promised any economy of production if they wished to remain in business. They tried a great many things that did not fulfill their promises, but some of the things stuck. This is true of methods as well as of appliances. Nowadays anthracite is being pushed very hard in the market by bituminous coal and the anthracite operators must adopt every possible economy if they expect to retain a fair share of the business. There are some fields in which they cannot compete with soft coal (they cannot reach most of the steam markets, for instance), but anthracite has qualities which make its use highly desirable for some purposes.

If the anthracite people wish to retain their place in the fuel industry, they will have to fight for it and fight intelligently. They need to employ the most economical methods of production. They need to ship clean coal and nothing else. They need to clean it and size it efficiently and cheaply, by machinery as far as possible. And they need to show people how to use it; for there is no doubt that a large market is being lost which might be saved if the anthracite producers would teach people how to use coal. There ought to be a research bureau in the anthracite field devoted to the investigation of the properties of different hard coals and the proper ways to use the different coals and different sizes.

The anthracite people need above all to get away from a conservatism which is not the dignity of conscious rectitude, but merely the fear of innovation. They need to get up and hustle, and it looks as if they would have to do it very soon. Some of them are doing it now.

■

Will Mine Foremen's Certificates Be Necessary?

So many letters have been received asking whether mine foremen's certificates will be necessary in Pennsylvania after the New Year that it seems a few words might be desirable. The answer is "By law, no, and in practice, yes."

West Virginia has had certificated men for years, but until May 6, 1915, the state left it to the judgment of the operator whether he employed such men or satisfied himself with those who had not qualified. To his credit, be it said, the West Virginia mine owner rose to the occasion and in most cases employed only certificated men. A competent man always has his value, and the operators recognized that the certificate at least bore evidence as to qualifications along certain lines, though it told of course almost nothing about administrative ability.

But there is another view of this matter. We may well suppose that the State Workmen's Insurance Fund, the various private corporations undertaking liability insurance and the mutual insurance companies will all demand that the mines be run in a safe way. They will not be content to have an uncertificated man in charge. In fact it looks as if the act permitting uncertificated men to manage mines is nullified by the compensation bill and by the act creating a state insurance fund. That latter enactment clearly gives the State board a right to say what precautions shall be taken, for it says that "the board shall make reasonable rules and regulations for the prevention of injuries upon the premises of the subscribers, and they may refuse to insure, or may terminate the insurance of, any subscriber who refuses to permit such examinations or disregards such rules or regulations and may forfeit one-half of the unearned premiums previously paid by him."

What more reasonable rule can there be than that there should be a certificated foreman in charge of the mine and indeed that he should be in control? It may not be legally necessary for operation and yet absolutely mandatory for insurance. The man who insures with the State board has put his burden on the state in return for certain payments based on his payroll, and he has agreed to follow its requirements. Consequently the constitutional provision which inadvertently relieves him from responsibility if he employs one of a group of men certificated by the state no longer has any power.

He has entered into a contractual relation with the state in which he agrees to put a man in charge and that man a certificated man, and in return and for certain other valuable consideration the state agrees to provide from its funds for compensation. The operator could deal with some other concern than the state as with a private or a mutual company, but he does not. With his own free will he makes an arrangement with the State board, and it is such a one as the board decides to make. It hardly seems likely that the courts will rule that the State Insurance Board can lay no heavier burden on the coal industry than is provided by the provisions of the statute law relating to mines.

Perhaps, after all, the state of innocuous desuetude will be not that of the certificated foreman, but of the mine inspector. It is a serious question to this body of efficient men whether their occupation will not be gone when the State board and the private companies are making more stringent rulings than the mine inspectors are allowed to make under the statute law. Such companies as the Susquehanna Coal Co. and the H. C. Frick Coke Co.—though it is not fair to select these two from many others doing excellent work—already make inspection largely vain. What will happen then when all the companies will say to the inspectors, "Our mines are inspected under a more stringent rule than yours; more onerous conditions are met than you are allowed to impose and there remains absolutely nothing under

the law which you can require of us?" When this becomes general the trade of the mine inspector as an official to enforce the law will be gone, and he will be replaced by the man who is authorized to demand that the arbitrary rules of the State board and insurance corporations be followed.

The complaint has been somewhat general that the letter of the law is being followed by the inspection service and not the spirit of the enactments. It is doubtless true, for the inspectors are bound to follow the law verbally because the judges and juries to whom they will be answerable for any neglect are bound by the letter of the statute.

In clear contrast with this state of affairs in the state inspectorate will be found the conditions under insurance inspection. The inspectors of the insurance authorities will be able to get reasonable interpretations on the rulings of their central offices. An order issued by such an office can be modified in a week, whereas a new law may take three years.

In fact the operator will find conditions in the future more as they are in Great Britain and Canada. There, orders in council are issued which have the value of laws and supplement the statutes. They are arbitrarily imposed and more grievous than the statute law, but they can be modified by the power that issues them if they prove unfair or unsatisfactory.

If the Pennsylvania operators had been face to face with an order of council or the ruling of an insurance company when they were required to drill gas holes ahead of their operations, they would have found a more elastic correctible instrument than the law of June 9, 1911, against which protest and reason are alike vain.

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Cape Cod Canal's Usefulness

Although the Cape Cod Canal has been open more than 15 months, there is still a divided opinion as to its usefulness. So far it has not had an opportunity to serve any vessels from ports south of New York, partly because it was only in July that it was deepened to 18 ft. and partly because there is not any considerable saving in distance for boats from Philadelphia and the Chesapeake.

The Eastern Steamship Corporation for a time sent through some of its New York freight steamers, boats of the "H. F. Dimock" and "Herman Winter" type, about 272 ft. long and of 2,700 gross tons. Also, the steamer "Lansing," of 1,600 tons' gross registry, but now usually carrying less than 700 tons of coal, has been using the canal regularly. Aside, however, from the two lines of coal-carrying barges mentioned later, the bulk of the traffic thus far has been in the smaller-sized sailing vessels.

The canal is now dredged to 20 ft.; it is 100 ft. wide at the bottom and 200 ft. wide at the top, the Buzzards Bay entrance having a width of 300 ft. There is perhaps no prejudice quite so strong as that of the average mariner, and the fact that the approaches are waters unknown to most of the vessel masters, especially those in boats drawing 15 ft. or more, is something it will take time to overcome. In other words, the canal will have to show a marked saving in time to induce owners to order their boats through and pay the 5½c. per cargo ton loaded and 4c. per cargo ton light, these being the present rates. The saving of distance is not great enough

to make the canal route the obvious one under present conditions.

Among some of the shipping people there is a feeling that a favorable use of this route is dependent on tide, and that passage is often so delayed through adverse currents that the vessel might as well take its chance of rounding the Cape. Then, too, there is an opinion that vessels leaving the canal breakwater in Cape Cod Bay and later being caught by northeasterly winds have no harbor to run to and are too far inshore to be handled easily.

Sample opinions were expressed in the hearing given on Oct. 19 in Boston by Colonel Millis, of the United States Engineer Corps, on the proposal for a lane to be kept open through Vineyard and Nantucket Sounds. A representative of the Merchants and Miners Transportation Co., operating steamers between Boston, Norfolk and Baltimore, said that in fair weather his line did not care to use the canal and that in foggy weather it was hard to find it. Other captains and pilots said they saw no chance for the larger steamers and vessels using the canal to any extent until it was widened to 400 or 500 ft. and dredged still deeper than it is now.

There are some, however, who believe that even if the larger vessels do not go through, the number of towed barges will steadily increase and the outside route will be made that much less dangerous. Tugs and barges of the Lehigh Valley Transportation Co. tried the canal during the summer, but they have not as yet made it a practice. The fleet of the Pennsylvania Coal Co., freighting anthracite from the Erie and the New York, Susquehanna & Western, have used the canal quite consistently in recent months, but the number of boats is not large. If the Philadelphia & Reading Transportation Line, with its 12 tugs and 70-odd barges, should approve the new waterway, it would set the enterprise forward to a measurable extent.

The canal therefore is still in a development stage, and it cannot be said to have had any marked effect on the coastwise coal trade.

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Work Wanted by Texas Miners

A reader of *Coal Age* states that down in Texas a large number of men are out of employment and are desirous of securing work in the coal mines of some other field. Anyone wishing to communicate with these miners should let us know.

Coal Age will be pleased to act as a clearing-house for men who wish employment or for mine owners who are short of labor. Tell us your wants.

x

The Union Yet to Be

The operator's trials with the union are largely due to a few unreasonable persons and some day to offset the work of these the operator will help to post notices on the buildings announcing union meetings. He may add an admonition of his own asking his men to go and vote their preferences. He will then try to make the union a reflection of the popular will and not the work of a clique, the scheme of unscrupulous plotters. Incidentally, too, it may be added, he will do less plotting himself and harmony will replace the present unfriendliness.

Sociological Department

First Aid or Prevention

First aid seems like an old familiar friend and needs no introduction. A friend indeed it has been to many a man who has traveled the rough road to the hospital. When we stop to think of the things which have been done by the Government, by the Red Cross and by industrial corporations, we realize how important it must be. Many lives have been saved by resuscitation methods alone, and many otherwise serious injuries have been rendered trivial by prompt attention. But with all its sterling qualities first aid is at best only a part of the pound of cure and must be so considered. We have pensions for the aged, burial benefits for the dead, insurance for the sick, first aid for the injured, but none of these things can be termed "prevention."—H. S. Salmon.

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Indiana State First-Aid Meet

The rules of the Indiana State First-Aid Meet at Bicknell, Oct. 30, represent extended experience in the management of intercompany and open meets and contain much material which might well be copied elsewhere. Information regarding such rules is often requested, and for that reason they are printed here.

1. A team shall consist of a captain, four assistants and a patient. Teams may bring their own patients or upon request one will be furnished by the judges.

2. The captain may designate the member or members of the team by whom the event is to be performed.

3. The captain will control his team in its field work and stretcher drill, but only when the full team is engaged. The captain or other members must not prompt a person or persons performing the event unless he or they are participating in that particular event. In team events the captain may take actual part in the contest himself or merely direct the team.

4. The captain may take an actual part in bandaging in all events.

5. At the conclusion of any event the captain must raise his right hand and announce his team number. The team will remain at its post until relieved by the judge.

6. Teams must furnish all their own first-aid material, including bandages, splints, blankets, etc., and shall not be allowed to leave the patient in order to obtain material.

7. The triangular bandage shall be regarded as the standard in the contest, but roller bandages may be used, and equal credit will be given for their proper handling.

8. All splints must be prepared on the field during each event requiring their use.

9. No practicing will be allowed on the field before the beginning of the contest.

RULES BY WHICH JUDGES WERE GUIDED

10. The teams will be numbered consecutively, beginning at No. 1, and they must occupy the positions assigned to them on the field.

11. Judges will perform their work progressively. If there is a sufficient number of judges, judge No. 1 will judge team No. 1 in event No. 1; judge No. 1 will judge team No. 2 in event No. 2, etc. Where it is necessary to have each judge scrutinize two or more teams at a time, the same procedure will be followed as far as practicable. Judges will thus progress in each event to the team or teams of the next higher numerical designation, returning to the first team or teams when they have judged all the others. The judges will be selected by the committee on judging. The judge's decision regarding the time allowed for events and for removal of dressings should be communicated to team captains by the officials of the meet before the contest begins.

12. Each judge will be required to scrutinize the work done in each event and may call upon the captain or member who applied the dressing to explain his treatment.

13. An event embraces a problem which may call for the treatment of one or more injuries and the handling of the patient.

14. The events for the contest will not be announced until the teams are on the field and in their positions, each event being announced just prior to its performance.

15. Each judge will mark the team number, event and discounts for each team, sign his name and deliver the report to the chief judge after each event, who in turn will deliver these reports to the recorders to be checked. Suitable record cards for the use of the judges will be printed in advance and turned over to the chairman of the judges the day before the contest.

16. The recorders will add the discounts and mark the points made by each team in each event. The total points will be divided by the number of events, and the quotient will be the average for each team for the whole contest.

17. The points made in events performed to decide a tie shall not be included in the total points made in the whole contest.

18. Teams which make the highest average and tie score in events for which honors or prizes are offered shall pre-



SCENE AT THE RECENT BICKNELL MEET

cede all other teams having a lower score in the original events.

19. All ties shall be decided by special events.

20. Teams will not be discounted for slow work unless they exceed the allotted time or fail to give treatment promptly. All events will commence and be finished at the sounding of a gong or other audible signal, the meaning of which should be communicated to all team captains before the events commence.

21. Any standard style of stretcher may be used except where the event calls for an improvised litter.

22. The prizes will be listed by the committee on awards.

23. Donors of prizes will be required to advise the committee on awards of the manner in which their prizes shall be awarded, based upon these rules.

24. The judges have been instructed to discount a team 18 points for applying a dressing to the wrong limb or the wrong side of the body. The points will be made up as follows: Lack of attention, 2 points; not locating injury, 4 points; improper treatment, 12 points.

25. In events requiring artificial respiration a judge may require a team to perform the action separately if he is judging more than one team.

26. All splints and paddings used in the contest must be prepared during the event in which they are to be used.

27. Preceding all events it shall be the duty of the captain of each team to see that all triangular bandages are unfolded, as no folded triangulars will be permitted unless they have been folded during the event for which they are to be used.

Public School Conference at Trinidad, Colo.*

The Public School Conference at Trinidad, Colo., was the outgrowth of a gathering at Sopris in the same state last April, at which a small group discussed matters pertaining to the public-school and related activities in Sopris and adjacent Colorado Fuel and Iron Co. camps.

It was decided at that time to arrange for a larger conference at Trinidad and to invite the coöperation of



JOHN D. ROCKEFELLER, JR., AND MISS EDNA CAMPBELL'S SCHOLARS AT BERWIND

all interested in the public schools of Las Animas and Huerfano Counties. Much of the success of the conference was due to the presence and hearty support of Mrs. Mary C. C. Bradford, state superintendent of public instruction, and the county superintendents of these two counties. The work also of W. E. Bragg, representing the Colorado Fuel and Iron Co., was untiring and effective.

The registered attendance, not including many occasional visitors, was as follows: Teachers and directors from schools in Colorado Fuel and Iron camps (this includes every teacher in the schools in these camps), 61; from other schools in Las Animas and Huerfano Counties, 154; public-school officials and visitors, 21; total, 236.

*From the Colorado Fuel and Iron Co. Industrial Bulletin, October, 1915.



SOPRIS SCHOOLHOUSE, WHERE CHILD'S WELFARE EXHIBIT WAS DISPLAYED

Among the prominent visitors and speakers from outside these counties, in addition to Mrs. Bradford, who aided the conference either by their presence or by also participating in the program, were: Mrs. J. F. Welborn and Mrs. J. A. Writer, of Denver; Mrs. W. C. Borst, of the Denver public schools; Miss Mary L. Oberlin, of the State Agricultural College; Dr. L. D. Osborn, of the University of Colorado; Prof. J. F. Keating, of Pueblo, and Prof. E. D. Randolph, of the State Teachers College.

On Thursday evening preceding the conference the visitors and speakers were the special guests of the Lincoln School of Sopris at a delightful dinner prepared and served by the domestic science pupils in the cottage recently erected by the company for the use of this department of the school.

On Friday evening the delegates were the guests of the company at a dinner served in the Trinidad Presbyterian Church.

Mrs. Bradford, state superintendent, in speaking of the camp schools and of this conference, says:

The most remarkable educational work of its kind in Colorado is being carried on in the camp schools of Las Animas and Huerfano counties. The teaching force seems thoroughly alive to the most advanced present-day educational demands and is doing practical work which will fit the pupils for the



A LINE-UP OF THE EDUCATORS AT THE TRINIDAD SCHOOL CONFERENCE

duties of life and teach them good citizenship—a majority of them being children of foreign parents.

Beginning with the tiny pupils in kindergarten, first-aid is taught through all the grades of the schools.

The conference was not only the largest and most educational ever held in southern Colorado, but was unusual of its kind.

At the Sopris camp a remarkable little community house has been erected by the Colorado Fuel and Iron Co. and rented to the public schools, and there is evident a strong desire on the part of the company to better the living conditions of all classes of employees.

X

Quit Your Grumblin'

Quit your kickin', old man—it's not any use
To fight Mr. Trouble with jawbone abuse.
If you want to succeed, it's not any way
To go around kickin' and wastin' your day.
If you can't make the hill a-runnin' on high,
Just throw her in low, and never say die.
The first in the start may finish the last,
So keep on a pluggin'; don't hurry too fast.
Keep smilin'; don't worry; you'll make it all right.
If you just keep a-tryin' with all of your might.
Don't waste your time kickin', but throw off your coat
And dig in and root like an Arkansaw shote.
If you think with old Fortune you have a rare pull,
You're kiddin' yourself with a poor line of bull.
If you want to make good, you'll have to go through
With a stiff course of trainin' before you will do.
So cut out your kickin' and turn off the bile
And jump in and work, with a song and a smile.

X

The United Mine Workers Will Hold at Des Moines, Iowa, a first-aid meet from all parts of subdistrict No. 3, District 13. J. J. Forbes, representative of the United States Bureau of Mines, is supporting the movement. The meeting will be held in the Des Moines Coliseum, and 40 teams of six men each will compete, some of whom have been active in first-aid work for four years. Several labor leaders will probably attend.

Discussion by Readers

Handling Cars on Pitches

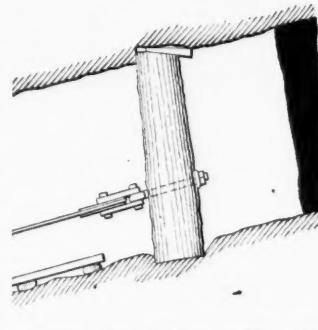
Letter No. 2—Replying to Mine Superintendent's request for a practical method of handling cars in rooms where the grade is too steep to enable them to be safely handled by hand, permit me to say that the method as described in *Coal Age*, Oct. 23, p. 687, in answer to this inquiry, can be worked successfully. I may say that there is no such thing as failure in this system if the grade is sufficient to overcome the friction of the moving cars. My experience of 20 years in the operation of such inclines enables me to say that where economy is a chief factor this system meets every requirement.

As has been suggested it is always possible to lessen the grade by driving the rooms across the pitch or at an angle with the level. This also widens the range of application of the different methods of handling cars in pitching seams.

The double-track, self-acting incline, owing to its simplicity, is a great convenience to miners when working on pitches where it can be used. The system is well understood and needs little explanation further than that already given. Every miner knows how to set an 8-in. or 10-in. post at the head of an incline so as to hold the load. There are, however, different methods of attaching the sheave wheel to the post. I have been accustomed to use a long bolt that is passed through a hole bored in the post about a foot above the level of the rails, as shown in the accompanying sketch. The end of the bolt is threaded for a nut, and a heavy washer is used under the nut so as to give a better bearing against the back of the post.

A chain is often used in preference to the wire rope, for the reason that the strands of the rope are apt to be broken by passing over a small sheave. Besides, if the chain is broken, it is more easily and quickly repaired than a rope, which must be spliced—an operation not always understood by miners.

The double-track system has one disadvantage. It necessitates keeping a larger number of cars in use, since there must always be one empty car and one loaded car in each room. To overcome this difficulty, a small heavy iron truck called a "barney" is sometimes employed. This consists of an iron casting 3 in. thick and about $3\frac{1}{2}$ ft. long mounted on small wheels. This barney takes the place of an empty car when lowering the loaded car from the face of the room to the entry. The barney may be operated on another track at the side of the loaded track, but it is sometimes made to run on light rails laid between those of the main track. In this arrangement the



SHOWING POST SET AT
HEAD OF ROAD TO
HOLD SHEAVE

barney passes under the cars as they descend or ascend the incline. The weight of the barney must be such that it will partly counterbalance the weight of the loaded car and at the same time be sufficiently heavy to pull the empty car up the incline. The weight of the barney is regulated by extra iron plates that can be laid on top of the iron base, to which they are secured by bolts.

Another modification of this system that I have seen employed with success uses but a single track. In this case, the loaded car is well spragged so as to control its descent on the incline. When the two cars have come nearly together, the loaded car descending and the empty car ascending the incline, they are stopped. A timber is thrown across the track so as to hold the loaded car. The empty car is then turned up at the side of the track and the loaded car carefully lowered past it, when the empty is replaced on the track above the loaded car. The rope is now again coupled to the cars, after which the load is lowered to the entry.

I have seen all of these methods employed under varying conditions, and will say that Mine Superintendent need have no hesitancy in adopting one of them. The convenience of the system will quickly repay the slight expense of its installation. There should always be some attachment provided at the foot of the incline to hold the rope or chain when this is unhooked from the loaded car.

THOS. MULHOLLAND.

Ensley, Ala.

*

The Effect of Storage on the Analysis of Coal

In further discussion of the question, asked by R. T. M., *Coal Age*, Aug. 14, p. 271, I beg to add a few words to the explanation offered by Percy N. Coupland.

Mr. Coupland, in answering this question, writes that "the extent of deterioration in the coal would be determined by the percentage of loss in heat value." It is fully agreed that a calorific determination made on coal when first put in storage and again when removed from storage would show the loss in heat value for that period, but it is hardly correct to assume that this one and only determination would show the total loss and impairment sustained by storage.

When deterioration takes place in coal, it not only affects the chemical constituents but likewise the physical and coking qualities of the coal. In order to accurately determine the extent of deterioration an ultimate organic analysis must be made, by which is determined the percentage content of hydrogen, carbon, nitrogen and oxygen by difference. To ascertain the loss of byproducts and impairment of coking qualities, diminutive laboratory carbonization tests are required. Some coals that are easily susceptible to oxidation in storage show noticeable changes in the composition of the volatile matter even in six months' time, as for instance, a loss of ammonia and tar and a fluctuation in the percentages of carbon dioxide and hydrogen sulphide.

The composition of the gas evolved from weathered coal has been shown to differ from that of fresh coal in that there is an increase in the percentages of hydrogen and carbon monoxide and a decrease in the percentages of methane and illuminants, which give a resulting gas of lower B.t.u. value per cubic foot of gas.

To certify to the extent of deterioration of coal during storage, in the full sense of the word, involves more work than the singular determination of calorific value. While it is the general opinion that it is not necessary to conduct elaborate tests as mentioned for the ordinary consumer of coal, yet the results of such tests are essential and prove of operating importance where weathered coal is coked in the modern byproduct coke ovens and where its every quality and constituent has a definite value and purpose.

Joliet, Ill.

BYKEM.

3

Responsibility of Miners

Letter No. 3—Referring to the letter of C. W. Rotenberry, *Coal Age*, Sept. 18, p. 472, I note that he mentions briefly the rapid growth of the safety-first movement and the great favor that it has met among mine officials and operators in recent years, resulting in the reduction of accidents and the saving of many lives. The writer of the letter censures the newspaper press for the attitude it has assumed, claiming that it educates the miner to believe that "companies are directly and wholly responsible for the safety of their employees in the mine."

INCREASED SAFETY IN MINES TODAY

Mr. Rotenberry then refers to the "great advance" that mine officials have made in the direction of safety. It is true that mine officials as a class have made rapid advancement in many things pertaining to safety in mining during recent years. Two principal reasons can be assigned for this result:

First, the requirement of many state mining laws that mine foremen must hold certificates of competency before being permitted to assume the duties and responsibilities of such a position is being better enforced now than formerly. In many instances the applicants for these certificates are obliged to pass rigid examinations on practical questions pertaining to safety in the operation of mines, and the standard of these examinations has been gradually raised so as to attain a higher degree of efficiency among successful candidates.

Second, operators today are seeking mine officials who are proficient in safety measures and can intelligently instruct their men in what is required. In order to enforce safety measures, a mine official must practice them himself. Mine foremen are coming to realize that this is one of the chief requirements of their position.

FORMER PRACTICE IN TESTING FOR GAS

As an illustration I shall cite an incident in my own experience. A little more than 30 years ago I was digging coal in a place where no gas had been found previously. When I went into my room one morning, the open light I carried ignited some gas that had accumulated the night before at the face of the room. Although I was not seriously burned, the flame having passed over my head, I went out of the mine and did not work that day. On returning to work the next morning, the boss told me to lower the flame of my light on going into the room and to

raise it carefully toward the roof to see whether there was any gas there. Not knowing any better, I followed his instructions, but fortunately for me no gas had accumulated that morning. What would be said of a mine foreman giving such instructions to a miner today?

REQUIREMENTS RELATING TO MINERS

Again, speaking of safety Mr. Rotenberry says, "Miners, as a class, have retrograded along this line." While miners may not have advanced as rapidly as mine officials in respect to safety, I do not think they have retrograded. The responsibility for their slow progress in this direction rests with the mining laws, which do not require a fixed standard of competency on the part of the miner. At least this is the case in the majority of coal-mining states. In former years a miner was required to serve as helper for several months, working with an experienced miner before he was permitted to mine coal alone. With few exceptions, there is no such requirement of miners today, but men fresh from the farm and the factory, without any training or previous experience in mining, are permitted to enter the mine and dig coal. It is clear that these men are unable to protect themselves properly while at work in the mines.

I have observed a growing tendency in some mining sections to relieve miners of any personal responsibility for their own safety, supplementing the responsibility of the miner by the efficiency of the foreman and other safety officials. This is too great a responsibility to be shouldered by the foreman. The personal responsibility of the miner cannot be shifted to the shoulders of a foreman, however efficient the latter may be. When a miner realizes his own responsibility, he becomes more prudent and careful in his work.

I do not know that miners are more reckless and careless than other workmen, as is often charged, but it is a fact that many miners assume unnecessary risks. No doubt many accidents result from this cause, while the responsibility for their occurrence is charged to the inefficiency of the foreman. It must be admitted that miners, for the most part, possess the necessary knowledge of what is required to safeguard themselves, but they are prone to wait for the mine foreman or another mine official to instruct them before taking the precautions they know to be necessary.

SHORT HOURS TEND TO CARELESSNESS

I believe it was Savonarola who said, "One only knows what he practices." A knowledge of any calling is of little or no value if not practiced or judiciously employed as occasion may require. For instance, an experienced miner who carelessly works under a loose piece of slate is as likely to be killed as the laborer who has no knowledge of the impending danger. Therefore it is not so much what a man knows as what he practices.

I agree with the suggestion that the shortening of the hours in which a miner must perform his work has a tendency to make him careless. It may be added that a reduction in the price paid for mining has the same tendency, as the miner must load more coal in less time in order to make the same amount of money as formerly. As a consequence, he neglects setting the necessary timber to protect himself while at work.

JOHN ROSE,
Dayton, Tenn. Former District Mine Inspector.

Store Checks vs. Thrift

Letter No. 7—I have been reading the letters published in *Coal Age* on the subject of "Store Checks vs. Thrift," and in one instance only (Letter No. 4, page 863) has it been plainly shown that thrift is a characteristic virtue inherent in the individual and one that should not be influenced either favorably or unfavorably by the accident of environment.

An individual who has developed this virtue with respect to financial matters has learned several important lessons in economy. He has acquired a certain amount of control over indiscreet tendencies and trained his mental faculties in the most important of their operations—thought. He has learned that his wages are an interest or dividend paid on his invested capital; that labor is the only way by which his present strength and skill can be converted into a tangible means of support in later years when his earning capacities are on the decline and become less remunerative. He has acquired the power to deny the gratification of his selfish desires and trained his thoughts and directed his energies to securing the material welfare of himself and those dependent upon him.

It is to be regretted that this virtue is not characteristic of the coal miner. It may seem harsh to say that a large percentage of coal miners are naturally selfish. As a class they are commonly considered to be large-hearted, sympathetic and generous, and they certainly do possess these qualities in a large degree. But it is the free exercise of these attributes without due thought of the future that is productive of selfishness. When a man spends his wages without proper regard to the material welfare of his family, he is gratifying a selfish wish or desire, whether it be participated in by the whole household or not.

A THRIFTY MAN MAY ALWAYS BE IN DEBT

The exercise of thrift does not necessarily result in the accumulation of wealth, neither is the thrifty man always free from debt. Circumstances may be such that the earnings may not be adequate to meet the necessary expenditures; but any saving is always the evidence of thrift if it accomplishes no more than the reduction of a debt. It has been candidly admitted by employers that efficiency is the best recommendation of an employee and that a thrifty man is generally an efficient workman. It seems a natural conclusion, therefore, that it would be good policy on the part of all employers, especially those in the coal-mining industry, to afford their employees every possible advantage for the exercise of this virtue.

The abolishment of the store-check system or any other form of commercial transaction relating to the commissariat of a mining camp will not tend to develop the quality of thrift among the miners. On the other hand, the manner in which such stores are conducted may make a thrifty miner dissatisfied and result in his seeking another field where he will have an opportunity of saving a portion of his wages by the exercise of thrift, even though his earnings may be less.

A SCHEME TO OUTWIT THE COMPANY

The manner in which company stores are often conducted affords many opportunities for the display of thriftlessness. The man who is constantly in debt at the store cannot always be regarded as a thriftless man, how-

ever. I have known instances in which the policy of keeping in debt at the store was pursued not merely as a scheme to secure steady employment, but as a means of banking savings. The scheme works as follows: A married man boards, as members of his own family and not as boarders, from four to eight employees of the mine where he works. He is generally a steady worker, but it requires more than his earnings to meet the monthly or semi-monthly store bills, and each succeeding month adds to his indebtedness at the store. Now, to help this good customer out, the store manager applies to the mine management and the delinquent is given steady work in the most remunerative place in the mine.

In the meantime, this man collects the board of his lodgers and banks it, making no effort to discharge his indebtedness at the store. Let me ask, Who is the goat in this case? Is it not a true business maxim that the man who meets his indebtedness promptly pays for the deficiency caused by the man who does not? Then, the thrifty, honest man must not only bear the burden of the business profits, but the losses as well. The instance I have cited will no doubt be pronounced by store managers and others as dishonest, and so it is. But is it any more dishonest than for the manager to make up his losses by increasing the prices of the goods he sells? Commissariat stores doing business on such a principle are not a menace to thrift, but are cultivators of dishonesty.

DISCOUNTING STORE CHECKS

I have never had experience in camps where the discounting of store checks and their subsequent redemption in legal currency has been practiced, but it appears to me that any management that would tolerate such methods would be guilty not only of degrading the habits of the miners, but affording means for sharp practices on the part of speculators.

I have had experience, however, in camps where store checks were used only in exchange for goods at the commissariat, and this certainly cannot be regarded as an indication of a lack of thrift, but on the contrary it is an exhibition of good business sense. Even supposing I can discount a \$10 store check at 20 per cent. and invest the \$8 in cash at a store where I can secure a value in the necessities of life equal to what I could purchase at the commissariat for \$11 in script, I am then saving \$1 in cash. Instances of this kind can be substantiated. They are good examples of thrift and business policy. The loser in this case is the man who discounts the check, for it is redeemable only at the commissariat at the prevailing prices.

The prevalence of high prices and dilatory if not discourteous service are not the only features that are objectionable at company stores. There is often a compulsive feature that is even more objectionable than those mentioned. A miner is not told outright, in so many words, that the continuance of his job will depend on his dealing exclusively at the store, but this is intimated in terms that even the dullest intellect can comprehend. Nothing detracts so much from a man's self-esteem and his natural manhood as to know that his actions are controlled by compulsory methods. Circumstances may compel him to submit, but it will be under protest, and he will seize the first opportunity to "get even."

If commissaries were conducted along the lines suggested in Letter No. 4, the quality of thrift would not be

developed, but it would have a broader field and a freer scope for its exercise, to the financial betterment of all parties, while improvidence and recklessness would be restrained and curtailed.

A. M. INER.

—, Penn.



A Flooded Mine Proposition

Letter No. 3—Referring to the inquiry, *Coal Age*, Oct. 16, p. 646, on this subject and the suggestion following Letter No. 2, on the same subject, page 854 of the issue of Nov. 20, in regard to keeping boreholes a considerable distance in advance of the working faces, I desire to submit a rule adopted by the Tennessee Coal, Iron and Railroad Co. to prevent such occurrences, which is as follows: "When it is known that a place is likely to obtain a dangerous accumulation of gas or water, workings approaching such places shall not exceed 8 ft. in width, and the person or persons driving such places shall constantly keep at a sufficient distance ahead, not less than 20 ft. in advance, one borehole near the center of the working and one at each corner 20 ft. deep, at an angle of 45 deg., at intervals of 6 ft. These holes shall not be used for blasting, but separate holes for blasting, not over 4 ft. deep, must be drilled. These precautions must begin at least 100 ft. from the probable source of danger."



Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

LINEAR (U. S. TO METRIC)

	Millimeters	Centimeters	Meters	Kilometers
1 inch	25.400	2.540	0.0254	
1 foot	304.800	30.480	0.3048	
1 yard	91.440	9.144	0.0914	
1 rod			5.029	0.005
1 furlong			201.168	0.201
1 mile			1609.347	1.609

SQUARE (METRIC TO U. S.)

	Sq.In.	Sq.Ft.	Sq.Rods	Acres	Sq.Mi.
1 sq. millimeter	0.0015				
1 sq. centimeter	0.155				
1 sq. decimeter	15.500	0.108			
1 sq. meter		10.764	0.040		
(centare)					
1 sq. decameter		1076.387	3.954	0.025	
(are)					
1 sq. hectometer			395.367	2.471	
(hectare)					
1 sq. kilometer				247.104	0.386
1 sq. myriameter					38.61

SQUARE (U. S. TO METRIC)

	Sq.Mm.	Sq.Cm.	Centares	Ares	Hectares
1 sq. inch	645.16	6.45			
1 sq. foot		929.03	0.093		
1 sq. yard			0.836		
1 sq. rod			25.293	0.253	
1 acre				40.469	0.405
1 sq. mile					259.

CUBIC (METRIC TO U. S.)

	Cu. Inches	Cu. Feet	Cu. Yards
1 cu. millimeter	0.00006		
1 cu. centimeter	0.06102		
1 cu. decimeter	61.0235	0.0353	0.0013
1 cu. meter		35.3145	1.308

CUBIC (U. S. TO METRIC)

	Cu.Mm.	Cu.Cm.	Cu.Dm.	Cu.M.
1 cu. inch	16,387	16.387	0.164	
1 cu. foot		28,316.84	28.317	0.028
1 cu. yard			764.555	0.765

CAPACITY (METRIC TO U. S., LIQUID)

	Gills	Pints	Quarts	Gallons	Barrels	Hhd.
1 milliliter	0.008					
1 centiliter	0.085	0.021				
1 deciliter	0.845	0.211	0.106			
1 liter	8.453	2.113	1.057	0.264		
1 decaliter			10.567	2.642	0.084	
1 hectoliter				26.417	0.839	0.419
1 kiloliter				264.170	8.386	4.193
1 myrialiter					83,864	41,932

One myrialiter contains 10,48295 tuns.

COAL AGE

The reason for beginning these precautions so far from the probable source of danger is to allow for possible error in old surveys which cannot be checked or for the possibility of old maps not showing the final extraction of coal from the abandoned area. When the accuracy of the surveys and maps is assured, this distance can be lessened, but safety of operation must always be the first consideration.

In order to control the flow through one of these boreholes in case water or gas under pressure is encountered, the near end of the hole can be kept reamed out and a piece of pipe with a gate valve inserted and packed and braced so that the pressure cannot force it out when the valve is closed, and so as to prevent leakage around it, the pipe and valve being of sufficient size to allow the drill to easily pass inside of it. For instance, if a 1½-in. drill is used, after each shot is taken, the near end of the hole can be reamed out to make a tight fit for a 2-in. pipe, which can be inserted with a gate valve of the same size and the hole extended by drilling through the valve and pipe.

If desired, the water can be drained from the flooded workings through this valve, as it can be handled. When the water is tapped, a larger hole and pipe or several of them can be used if it is desired to drain the flooded workings more rapidly.

EDW. H. COXE.

Knoxville, Tenn.

The Coal Age Pocket Book

CAPACITY (METRIC TO U. S., DRY)

	Pints	Quarts	Gallons	Pecks	Bushels
1 centiliter	0.018				
1 deciliter	0.182	0.091			
1 liter	1.816	0.908	0.227	0.114	0.028
1 centistere		9.081	2.270	1.135	0.284
1 decistere			22.702	11.351	2.838
1 stere					28.378
1 decastere					283.777

The decastere is equal to 7,88269 chaldrons.

CAPACITY (U. S. TO METRIC)

(Liquid)	ML.	CL.	DL.	L.	KL.
1 gill	118.29	11.829	1.183	0.118	
1 pint		47.318	4.732	0.473	
1 quart			9.464	0.946	
1 gallon				37.854	3.785
1 barrel					119.241
1 hogshead					238.482
1 pipe					476.963
1 tun					953.929

(Dry)

	ML.	CL.	DL.	L.	KL.
1 pint	550.61	55.061	5.506	0.551	
1 quart		110.122	11.012	1.101	
1 gallon			44.049	4.405	
1 peck			88.097	8.810	
1 bushel				35.239	0.035
1 chaldron					1.269

CAPACITY (METRIC TO BRITISH)

(Wet and Dry)	Gills	Pints	Quarts	Gallons	Pecks	Bushels
1 milliliter	0.007					
1 centiliter	0.070	0.018				
1 deciliter	0.704	0.176	0.088	0.022		
1 liter	7.043	1.761	0.880	0.220	0.110	0.028
1 decaliter			8.803	2.201	1.100	0.275
1 hectoliter				22.008	11.004	2.751
1 kiloliter					220.083	110.042
1 myrialiter						275.104

CAPACITY (BRITISH TO METRIC)

(Wet and Dry)	ML.	CL.	DL.	L.	KL.
1 gill	142.0	14.199	1.420	0.142	
1 pint		56.797	5.680	0.568	
1 quart			11.359	1.136	
1 gallon			45.437	4.544	
1 peck			90.875	9.087	
1 bushel				36.350	0.036

The conversion factors in these tables have been derived independently from the following standards:

1 meter (U. S.) = 39.37 in. (1 in. = 25.4 mm.);

1 sq. meter = $39.37^2 \div 144 = 10.76386736$ sq.ft.;

1 cu. meter = $39.37^3 \div 1728 = 35.31445447$ cu.ft.;

1 liter = 61.02338189 cu.in.;

1 U. S. (Winchester) bushel = 2150.4 cu.in.;

1 British (Imperial) bushel = 2218.192 cu.in.

Inquiries of General Interest

Flow of Water in Pipe Line

Referring to the inquiry, *Coal Age*, Nov. 6, p. 773, I want to draw attention to an evident error in the answer given to the question asked, in respect to the change of head or pressure owing to the gradual contraction and enlargement again of the sectional area of the pipe. The answer gives the pressure at the contracted area as 256 times the pressure in the main pipe, which is evidently at variance with the well-known principle of hydraulics that should apply in this case where pressure head is converted into velocity head.

My figures show that, ignoring friction, there is a loss of 99.1 ft. in pressure head, owing to the contraction in the sectional area of the pipe and consequent increase in the velocity of the water. I estimate that this will be the difference in head up to the point where a vacuum occurs at the throat, when the carrying capacity of the pipe will begin to be reduced. In other words, the pipe will run full, in the case assumed, under any head not less than 99.1 ft. minus the head corresponding to the atmospheric pressure, which at sea level is practically 34 ft. This would make the limiting head in the main pipe, for full capacity, $99.1 - 34 =$ say 65 ft., and any less pressure would not maintain the full capacity of this pipe. I would like to see this question treated again in full.

T. R. HAYTON.

Appleton, Wis.

We thank correspondent for drawing attention to this oversight, which is quite apparent in the last paragraph of the previous answer in respect to the change of pressure head due to the contraction of the area of the pipe. In this case, owing to the gradual contraction and enlargement of the sectional area of the pipe, ignoring friction, the pressure head is converted into velocity head as the area reduces and is again changed into pressure head as the area enlarges.

The first step is to estimate the change in velocity due to the change in sectional area. For the same flow of water, the velocity varies inversely as the sectional area of the pipe. In other words, the velocity ratio is equal to the inverse area ratio, or the square of the inverse diameter ratio. Calling the original velocity and diameter v_1 and d_1 and the velocity and diameter at the throat v_2 and d_2 respectively, we have

$$\frac{v_2}{v_1} = \left(\frac{d_1}{d_2}\right)^2$$

Then, substituting the given values in this formula, the velocity at the throat is

$$v_2 = 5 \left(\frac{1}{3}\right)^2 = 5 \times \frac{1}{9} = 56 \text{ ft. per sec.}$$

The old Bernoulli theory, relating to the flow of fluids in conduits, makes the sum of the pressure head, velocity head and gravity head a constant throughout the length of the pipe line. The pipe line in this case being horizontal, the gravity head is zero and the sum of the pres-

sure head and velocity head is constant at any point in the pipe. Hence, calling the pressure in the main pipe h_1 , and that at the throat h_2 , we have

$$h_1 + \frac{v_1^2}{2g} = h_2 + \frac{v_2^2}{2g}$$

and

$$h_1 - h_2 = \frac{1}{2g} (v_2^2 - v_1^2) = \frac{80^2 - 5^2}{64.32} = 99.1 \text{ ft.}$$

This shows, as our correspondent has stated, that the loss in pressure head due to the contraction of the area is 99.1 ft., under the assumed conditions. Also, it is clear that this loss in pressure head holds true for these velocities, irrespective of the head in the main pipe, which can be reduced to $99.1 - 14.7 \div 0.434 = 65.3$ ft., at sea level, before a vacuum will form at the throat and reduce the capacity of the pipe.

Problem in Mathematics

Will you kindly show the correct solution of the following problem: An army of soldiers in single file is 50 mi. long. Assuming that the soldiers, marching continuously, go 50 mi. in 10 hr., if an officer starts at the same time from the rear of the column and walks the entire length of the line to its head and then turns and walks back and reaches the rear of the column in the same time that the soldiers complete their march of 50 mi., how far has the officer walked in the 10 hr.? I am told that the correct answer to this example is 120.6 mi.

PAUL CERAR.

Assume the officer walks at the rate of x mi. per hr. The soldiers march at the rate of $50 \div 10 = 5$ mi. per hr. Therefore, the officer gains on the soldiers $(x - 5)$ mi. per hr., and he will gain the length of the column, or 50 mi., in as many hours as $x - 5$ is contained in 50.

When walking back toward the rear of the column, while the officer is walking x mi. toward a soldier, that soldier is walking 5 mi. toward the officer, which makes the total ground covered, or the distance the officer has approached the rear of the column, as measured along the column, $(x + 5)$ mi. in 1 hr. At this rate the time, in hours, required for the officer to reach the rear of the column and complete his task will be found by dividing the length of the column (50 mi.) by $x + 5$, the gain per hour. This must then be added to the time the officer took to reach the head of the column.

Since the total time of marching is 10 hr., we write the equation

$$\frac{50}{x - 5} + \frac{50}{x + 5} = 10$$

$$5(x + 5) + 5(x - 5) = (x + 5)(x - 5)$$

$$x^2 - 10x = 25$$

$$x = 12.07 \text{ mi. per hr.}$$

The distance the officer has walked in 10 hr. is therefore $10 \times 12.07 = 120.7$ mi.

Examination Questions

Miscellaneous Questions

(Answered by Request)

Ques.—(a) What are permissible explosives? (b) What conditions make their use necessary in a mine? (c) Why are they safer than black powder?

Ans.—(a) A permissible explosive is defined by the Bureau of Mines, in its Miners' Circular No. 2, page 5, as being an explosive that "is similar in all respects to the sample that passed certain tests by the National Bureau of Mines and when used in accordance with the conditions prescribed by that bureau."

The same bulletin, page 6, explains: "An explosive named in the permissible list if kept in a moist place until it undergoes a change in character is no longer to be considered a permissible explosive. If used in a frozen or half-frozen condition, it is not when so used a permissible explosive. If used in excess of the quantity specified (1.5 lb.) it is not when so used a permissible explosive. And when the other conditions have been met, it is not a permissible explosive if fired with a detonator of less than the prescribed strength."

The Bureau of Mines also reserves the right to withdraw from the list of permissible explosives any explosive previously listed as such, which then ceases to be a permissible explosive.

(b) The presence of a dangerous quantity of gas or dust in the mine workings makes the use of permissible explosives advisable if not absolutely necessary in order to prevent accidents common to the use of black powder for blasting coal. By order of the Secretary of the Interior, the use of permissible explosives is made compulsory in the coal mines of the Indian Lands of Oklahoma.

(c) Permissible explosives are generally safer than black powder in the blasting of coal because they produce less flame in their explosion and the conditions under which they must be used, as prescribed by the Bureau of Mines, have the effect of reducing to a minimum the risks of blasting coal in gaseous and dusty mines.

Ques.—What is the capacity of a double-acting pump, when the plunger is 20 in. in diameter and has a 40-in. stroke, the pump running at 25 r.p.m.?

Ans.—The piston speed of this pump is

$$S = \frac{4}{12} (2 \times 25) = \frac{500}{3} \text{ ft. per min.}$$

The capacity of a pump (G), in gallons per minute, for an efficiency (E), a piston speed (S), in feet per minute and a diameter (d), in inches, is given by the formula

$$G = 0.0408 E S d^2$$

Now, assuming an efficiency of $E = 85$ per cent. and substituting the given values in this formula, we find for the capacity of this pump

$$G = 0.0408 \times 0.85 \times \frac{500}{3} \times 12^2 = 2,312 \text{ gal. per min.}$$

Ques.—If a fan is circulating 57,000 cu.ft. of air per minute, with the expenditure of 39 hp., what horsepower

will be required to increase this circulation to 87,000 cu.ft. per min.?

Ans.—Assuming there is no change in the mine airways, the horsepower producing the circulation varies as the cube of the volume of air produced. In other words, the power ratio is equal to the cube of the quantity ratio, which gives here

$$\frac{H}{39} = \left(\frac{87,000}{57,000} \right)^3 = \left(\frac{87}{57} \right)^3 = 3.56, \text{ nearly}$$

$$H = 39 \times 3.56 = 138 + \text{hp.}$$

Ques.—A fan running at a speed of 60 r.p.m. produces a water gage of 2 in. (a) If the speed of this fan is increased to 90 r.p.m., what pressure will be produced? (b) If the quantity of air in circulation at this increased speed of the fan is 100,000 cu.ft. per min., what is the horsepower on the air?

Ans.—(a) For the same mine or airway, the quantity of air in circulation varies as the fifth root of the fourth power of the speed. In other words, the quantity ratio is equal to the fifth root of the fourth power of the speed ratio, which makes the quantity ratio in this case

$$\frac{Q_2}{Q_1} = \sqrt[5]{\left(\frac{90}{60} \right)^4} = \sqrt[5]{\left(\frac{3}{2} \right)^4} = \sqrt[5]{1.5^4} = 1.383$$

Then, since the pressure in any circulation varies as the square of the quantity of air passing, the pressure ratio is equal to the square of the quantity ratio, or in this case $1.383^2 = 1.9$, and the pressure due to the increased speed of the fan is therefore

$$p = 5.2(2 \times 1.9) = 19.8 \text{ lb. per sq.ft.}$$

(b) The horsepower on the air is then

$$H = \frac{Qp}{33,000} = \frac{100,000 \times 19.8}{33,000} = 60 \text{ hp.}$$

Ques.—In a gaseous mine where 160 persons are employed, would you consider the ventilation sufficient, providing the quantity of air in circulation is equal to 150 cu.ft. per min. per man?

Ans.—This volume of air in circulation may meet the requirements of the mining law in the state where the mine is located; but owing to certain physical conditions in the mine, such as a large opening, great thickness of seam, frequent large gas feeders or sudden emission of gas from the roof in large quantities or the presence of much fine dust of a highly inflammable coal, this volume of air may prove wholly inadequate for the safe working of the mine.

Ques.—How much oxygen will be required for the complete combustion of 100 cu.ft. of marsh gas?

Ans.—First write the chemical equation expressing the reaction that takes place when marsh gas (CH_4) is burned in oxygen (O_2); thus,



This equation shows that each molecule of marsh gas consumes two molecules of oxygen, and as these gaseous molecules are of equal size, it follows that 100 cu.ft. of marsh gas will consume 200 cu.ft. of oxygen.

Coal and Coke News

Washington D. C.

Further and decided improvement in coal-mining conditions is portrayed in the reports of the business situation sent to the Federal Reserve Board by agents of that body and published in the Federal Reserve Bulletin for Dec. 1.

From the Pennsylvania district it is reported that there is "a decided improvement in coal mining, many collieries working to capacity. Shippers, however, are confronted with a shortage of cars which is likely to check the output to some extent. Crude oil and oil refining are operating at full time, with a good demand and increasing prices. Considerable foreign business is being done. The Delaware River shipyards are busier than ever."

From Cleveland the report comes that "the coal trade shows little change over last month, except a tendency to further improvement through the activity and advance in other lines."

Richmond writes that "some coal concerns are now doing the largest business in their history. At some points there is car shortage. Mines are working at full capacity and some concerns have ceased giving out quotations on spot product. While a heavy export demand continues, the consumption for domestic purposes is greatly increased. Prospects for the future are better than fair, operators fearing only the possible handicap of shortage in labor."

From Kansas City it is stated that "the oil industry is more active than it has been at any time during the present year."

HARRISBURG, PENN.

Regulations with which the employers of Pennsylvania must comply if they desire to carry their own workmen's compensation liability insurance are being prepared by the Compensation Board.

A number of big corporations, such as coal, railroad, steel and other companies, are asking upon what terms they may secure exemption from the necessity of insuring either in the state fund or in stock insurance companies against payment of compensation, and the terms set out will permit them to carry their own insurance subject to the approval of the board. It is also required that when the board directs payments must be made to a bank or even securities deposited with the state fund so that workmen may be protected.

The data to be furnished to the Compensation Board are similar to that furnished for state taxation, and are to be held confidential. Location, kind of employment, average number of employees and estimated payroll are required with a statement of assets and liabilities, together with a statement of capital, value of patents, trademarks, good will and property, as well as a statement for three years of sales, expenses, payroll and profits. Special inquiry is made as to debt, safety, welfare and sanitation conditions, whether Department of Labor requirements are met, kinds of inspection, whether there is a safety committee and a hospital, together with data on past accident experience.

The applicant must accept the schedule of payments for compensation and must agree to deposit money required to meet compensation awards or must file money or securities or a bond equal to a year's premium. Where there is a subsidiary company the parent company may be required to give a guarantee of payment.

The board will reserve the right to make further inquiry as to financial standing at any time and to act accordingly.

Reduction in Railroad Rates Postponed

Reductions in anthracite coal rates ordered by the Interstate Commerce Commission, to become effective Dec. 1, were postponed on Nov. 23, until January 1.

This is the second postponement. The original orders were to become effective Oct. 1, but on a showing by the railroads that the new tariffs required to be filed were complicated, a first extension of 60 days was granted.

A few weeks ago coal operators in the Wyoming region asked a rehearing in relation to the proposed rates on the smaller sizes of anthracite, alleging that the new orders were unjust when the rates were compared with those of the large sizes. There have been reports that the railroads might seek to overturn the decision through court proceedings, but

so far there has been no evidence before the commission of such an intent. The new rates apply between the Pennsylvania mines and the Atlantic seaboard.

The Interstate Commission on Aug. 12 gave a decision reducing railroad rates on anthracite coal from the producing districts in this state to tidewater points of 10c. a ton, and to certain points 15c.

The decision was the result of an investigation made pursuant to an order by the commission on June 10, 1912. It was the finding that rates are unreasonable, because they yield too great a profit over operating cost in the traffic.

In the case of the coal traffic of the Central R.R. of New Jersey it was found that the weighted average cost a short ton-mile was 3.3 mills, while the average revenue a ton-mile was 9.45 mills and on the long tons 10.59 mills. This comparison was held to be typical of the majority of the roads concerned.

In most cases the carriers were declared to be making over 200 per cent. on the traffic and in many cases much more. For a number of the smaller roads less favorably situated the decision, it was figured, meant a decided loss. It was estimated by experts that the total reduction of coal-road revenues would be fully \$8,000,000.

PENNSYLVANIA

Anthracite

Scranton—The Carney & Brown Coal Co.'s breaker on the outskirts of the city was totally destroyed by fire at 5 o'clock on the afternoon of Nov. 26, with a loss of \$50,000. The breaker had a production of 500 tons of coal per day and employed about 200 men and boys. The origin of the fire is unknown.

Shamokin—The collieries in this district have been badly handicapped by the lack of empty cars. The Philadelphia & Reading Ry. Co. is doing everything possible to deliver the equipment to the mines but despite its efforts a number of collieries have recently been compelled to close down. The railway company is also experiencing some difficulty in moving the loaded cars destined to points east and south.

Centralia—Two miners were entombed on Nov. 27, in Packer No. 5 colliery of the Lehigh Valley Coal Co. by an explosion of gas. The dead bodies of both men were found by rescuers in the gangway 1,500 yards from the scene of the explosion which did great damage and forced a suspension of all work in the colliery. The men who were working in other sections of the mine were hoisted to the surface in safety. The first level of the mine took fire for nearly 1,000 yd. Nearly all the leading mine officials and state mine inspectors of this region were on the scene with fire fighting apparatus and the company is stopping at no expense to conquer the flames.

Buck Mountain—A half century and more ago the mine of the Lehigh Valley Coal Co. here was supposed to have been worked out. However the company has relocated a coal bed and is now conducting large stripping operations and it is announced that the coal will last many years. As a result the village which was practically abandoned has taken on new life and the erection of 40 houses has been ordered by the company. The company will also spend about a million dollars in the building of a tunnel to drain the mine, work on which has already started.

Tamaqua—In preparation for the provision of the Compensation Law effective Jan. 1, 1916, the smaller anthracite companies are having insurance companies examine their mines with a view to taking over the insurance of their pay rolls. Some of the smaller companies who have but few employees and a limited income will retire from business at the close of this year.

Car shortage caused a curtailment of production during the past week, and despite the efforts of the railroads there is no apparent cause to expect better conditions for some time. The much-heralded shortage of labor in and about the mines is confined solely to laborers, aside from this class of help the usual number of applicants for mining positions can be found at the collieries. The nearby powder and munitions plants are taking some of the men but in many cases these men find conditions too burdensome, and are either discharged quickly or return to the mines voluntarily.

Hazleton—For two years the Mineral Spring colliery of the Lehigh Valley Coal Co. has been awarded the banner for having the neatest appearance around its outside workings. Five years ago when the company offered a banner to the men making the best showing this colliery stood 17th. It was ranked No. 9 the next year, following this with No. 3, until in 1913 it took first place and has held it ever since, although this year it only won by $\frac{1}{2}$ of a point. As indicative of the men's interest in the contest they have surrounded the breaker with a green lawn and flower beds and often in the summer time they are to be seen after working hours and on Sundays watering the grass and flowers.

Mt. Carmel—After years of litigation the borough of Mt. Carmel has forced an agreement with the coal companies under which the latter will provide a sewer outlet since the natural waterways have been blocked by coal dirt. It will require a considerable expenditure by the coal companies to open the proposed channel.

BITUMINOUS

Connellsville—The Connellsville coke region is sorely in need of men to operate the coke ovens properly. The region is at present running 81 per cent. capacity and 94 per cent. efficient, that is the 31,700 active ovens capable of producing 460,000 tons of coke per week are turning out only about 433,000 tons. This condition has prevailed for some time and cannot be remedied until more men are secured.

Latrobe—The old Duquesne plant of the Bradenville Coal and Coke Co. is being made ready for firing. This plant comprises 150 ovens and has been idle for several years during which time raw coal has been shipped from the mines. With new equipment installed throughout the plant is in good condition to take advantage of the favorable market for coke, and the firing of the ovens will be undertaken at once.

Indiana—It is stated that 3,000 additional men are needed in the Indiana County coal field. The coke ovens at the Ernest operations were recently fired for the first time in two years.

Uniontown—The Bird Coal Co. is making extensive improvements at its plant near Kelso.

WEST VIRGINIA

Charleston—Earl Henry, chief of the Department of Mines, recently announced that 16 men had been awarded first-class certificates from among more than 100 who recently took examinations here to become mine foreman. One man, George F. Carbough, of Carlisle, passed as a fireboss.

Boomer—Nineteen men are reported killed and 11 more are unaccounted for as the result of an explosion in the No. 2 mine of the Boomer Coal and Coke Co. on Nov. 30. Thirty miners were brought to the surface alive, and at last accounts hopes were entertained that more men might be rescued.

ALABAMA

Birmingham—The car shortage, while not acute, is being felt by the shippers, and fear is expressed that December and January will bring about a serious shortage of equipment. The railroads are endeavoring to prepare themselves for any such emergency and are bending every effort to avoid such a condition.

The Tennessee Coal, Iron and R.R. Co., in the Birmingham, Ala., district, is discontinuing the payment of machine men for coal cutting in the coal mines on a tonnage basis and is paying them by the day, the scale fixed for machine runners being \$3.75 per day. It is thought that some of the other coal companies in the district will follow the same plan.

KENTUCKY

Seo—The South East Coal Co.'s initial shipments now going out are destined to Detroit for distribution to the Great Lake trade. Much of the product of the South East mines will go to the markets of the North and Northwest, as well as the Great Lake trade.

Fleming—It is said that the consolidation of the Elk Horn Mining Corporation and the Elk Horn Fuel Co. into the Elk Horn Coal Corporation with something over \$28,000,000 capital will mean greater things in the development of coal land holdings in the eastern Kentucky field. The company owns a boundary of 200,000 acres lying in Letcher, Pike, Knott, Floyd and Magoffin counties. At present this company is putting out at the rate of 1,500,000 tons annually. Within the next few months the company will be putting out coal at the rate of 3,000,000 tons annually.

Whitesburg—The South East Coal Co. has begun operations on a lively scale between Fleming and Kona on Boone's Fork.

According to Perry County operators the production of that field will be doubled by the first of the year. The First Creek Coal Co., the Harvey Coal Co. and the Kentucky Block Coal Co. are three new companies which will be responsible for the increase.

Hazard—Preparations are being made to increase the output of the old North Fork Coal Co.'s operation, bought recently by the Daniel Boone Coal Co. New miner's houses are being built and a new field will be opened up.

OHIO

Athens—The New York Coal Co. has filed suit against the Sunday Creek Coal Co. and others, alleging its lease to the defendant company of certain coal lands, with the equipment used in operating them, and the removal by the defendants of this equipment, consisting of cars, rails, etc. A restraining order preventing the removal of further property of this nature has been issued. The New York Coal Co. bases its case on a provision which it alleges to be contained in its leases, prohibiting the removal of the personal property in the mines under certain conditions.

INDIANA

Terre Haute—Fire recently destroyed the tipple and adjoining buildings of the Vandalia Coal Co.'s mine at Liggett, causing a loss of about \$6,000. The cause of the fire is unknown. No one was injured. Chemical engines and hose trucks were sent from Terre Haute and prevented the spreading of the fire. The buildings destroyed will be replaced.

Boonville—The stripping machines at the Sunlight Coal Co.'s property and the Polk Patch coal mine are working day and night and are unable to fill all orders.

Sullivan—Orders have been received from the Federal Court by the receiver to lease the Glendora mine of the Consolidated Indiana Coal Co. to the Interstate Mining Co. at a royalty of 5c. a ton on a minimum of 30,000 tons annually and the St. Clair mine to the St. Clair Coal Co. at the same royalty on a minimum of 20,000 tons.

ILLINOIS

Virden—Nov. 22, fire completely destroyed the hoisting shaft, tipple and coal washer of the Chicago, Wilmington & Franklin Coal Co., entailing a loss estimated at \$200,000. Three miners were seriously burned. It is thought the fire was of incendiary origin having started in the weighhouse near the top of the tipple where evidence of burning oil was seen.

Williamson—An eccentric slipped on the engine while 10 men were being lowered Nov. 22 in the No. 2 mine of the Mt. Olive & Staunton Coal Co., the cage falling to the bottom of the shaft. It was only a few feet from the bottom when the machinery became disarranged. All of the 10 were hurt, but only three were sent to the hospital.

Maryville—The top works of the Donk mine at this place were recently saved by a bucket brigade when threatened by fire which destroyed the public school building. Lack of water in the fire cisterns of the town increased the danger to the mine property.

COLORADO

Denver—The Delagua Mine (Las Animas County) of the Victor-American Fuel Co. has been running full time during the past month. Production in Routt County is progressing rapidly as is natural in a comparatively new field. There is a small car shortage at present but a greater one is feared.

FOREIGN NEWS

Lethbridge, Alberta—An action for foreclosure has been brought in the Supreme Court of Alberta against the Canadian Coal & Coke Co. by the Royal Trust Co. for the bondholders, the amount involved being \$3,000,000. The stock of the Canadian Coal and Coke Co. is held principally in Montreal, the firm holding valuable coal leases near Lethbridge and elsewhere in Alberta. It is alleged that no interest has been paid on the bonds.

Glace Bay, N. S.—The output of the Nova Scotia coal mines has been seriously affected by the enlistment of miners. F. W. Gray, of the Dominion Coal Co. has brought this matter to the attention of the Canadian authorities. He states that his company alone has furnished some 1,500 men, or 14 per cent. of the total number employed. This has resulted in a diminution of the coal output of approximately 17 per cent.

Sydney, N. S.—Coal shipments from Sydney to St. Lawrence ports have closed for the season, and the total volume shows a considerable shortage as compared with 1914. The amount

shipped is approximately 1,500,000 tons, or some 400,000 tons less than shipments for last year. One cause for the falling off is the requisitioning by the British government of the vessels chartered by the company.

PERSONALS

R. G. Harris, for a number of years with the Davis Colliery Co., recently became a member of the sales force of the Cortright Coal Co., of Philadelphia.

Edward Coyne, of Ottumwa, Iowa, has been appointed by the State Board of Control to prospect for coal on the Flynn farm near Des Moines, and on the state farm at Knoxville.

J. L. Heizer was recently appointed chief clerk of the Department of Mines of West Virginia to take the place of W. L. Thomas. Mr. Helzer will assume the duties of chief clerk at once.

John Whelan, Jr., former superintendent of the Massillon Coal Mining Co.'s mines at Massillon, Ohio, has been appointed secretary of the Eastern Ohio Operators Association. Mr. Whelan will assume his new duties Jan. 1.

Howard D. Pfeiffer, general manager of the Chaffee Coal Co., Real Estate Trust Building, Philadelphia, Penn., recently incorporated as H. D. Pfeiffer & Co. for the purpose of acting as the sales agency for Chaffee coal and trading in other fuels.

Benjamin Timey, formerly assistant foreman at the Philadelphia & Reading Coal and Iron Co.'s Potts Colliery, was Nov. 24, appointed superintendent of the North Franklin Colliery. This plant is one of the largest and most complete in the Schuylkill region.

A. D. Macfarlane, of LaFollette, Tenn., chief engineer for the receiver of the LaFollette Coal, Iron and Ry. Co., was on a trip the early part of this week to Birmingham and Tuscaloosa, Ala., inspecting coal washers and getting data on coal washing operations.

A farewell dinner was given, Nov. 23, at the Planters Hotel, St. Louis, Mo., by men prominent in local coal circles and long time friends, in honor of A. J. Moorshead, president of the Madison Coal Corporation who will shortly remove to Chicago after many years of activity in St. Louis.

Frank Kettle, of Nanticoke, John B. Corgan, of Luzerne, and John J. Stickler, of Lansford, were named on Nov. 26, as the new mine inspectors to fill the vacancies created for Luzerne and Carbon Counties, Penn., by the act of June 1, 1915, to serve until their successors are duly elected and qualified, subject to district assignment by James E. Roderick, Chief of the Department of Mines.

Samuel Reynolds, 71 years old, resigned his position as slope engineer of Nottingham colliery, Plymouth, Penn., on Nov. 26, a position he held for 36 years and 6 months. Mr. Reynolds deciding to take life easy, resigned his position, purchased a small automobile in which to enjoy the surrounding country. In point of service Mr. Reynolds was the oldest engineer in the employ of the Lehigh & Wilkes-Barre Coal Co.

William E. McGann, inside foreman of the Buck Mountain Colliery of the Lehigh Valley Coal Co., had his skull fractured, and Thomas R. Jones, division superintendent of the Delano & Pottsville division of the Lehigh Valley Coal Co., was injured internally on Nov. 24, when their touring car and a Philadelphia & Reading Ry. engine collided. McGann's condition is critical. His skull was crushed in, and an operation by trepanning was performed. Mr. Jones' condition is reported as serious. The accident occurred when the touring car ran on the crossing in front of the engine, which was returning from one of the Philadelphia & Reading collieries.

OBITUARY

Dennis Reardon, for many years a member of the mine examining board of Pennsylvania, died recently at his home in Shamokin at the age of 51 years. Mr. Reardon had been in failing health for almost a year but his condition was not regarded as serious until shortly before his death.

J. M. Hedge died in Chicago, Ill., on Nov. 23, at the age of 58 years. For ten years Mr. Hedge was traveling salesman for E. L. Hedstrom & Co., and for the eight years past was Western traveling salesman for the Philadelphia & Reading Coal and Iron Co., being attached to the Chicago office. He is survived by a widow and two daughters. Interment was made at Cape Cod, Mass.

Louis Kortkamp, manager of a mine at Hillsboro, Ill., was recently killed in an accident there after he had gone into the mine to make an inspection. A train of coal cars was being hoisted up a slope, and three of them became uncoupled near the top. Mr. Kortkamp was instantly killed when the cars struck him. His brother, Carl Kortkamp, was killed in the same mine and in the same manner about a year ago.

William A. Fuller, aged 45 years, died at his home in Hazleton, Penn., on Nov. 25, after a short illness of complications. He was superintendent of the Hazle Mountain Coal Co.'s workings at Buck Ridge and Tomhicken. Taking charge 20 years ago when the Wentz interests had abandoned the "drowned" mines, he reclaimed all of the unmined coal by preventing a creek from flowing into the workings. Mr. Fuller's remains were taken to Scranton, where the funeral took place from the home of his sister Mrs. Storrs.

INDUSTRIAL NEWS

St. Louis, Mo.—The Illinois Public Utilities Commission has assigned Dec. 21, 22 and 23 for the coal interests to present their case against the carriers in opposition to the proposed general advance in soft coal rates within the state of Illinois.

Milwaukee, Wis.—The Jeffrey Mfg. Co., of Columbus, Ohio, has recently opened a new branch office in the M. & M. Bldg., Milwaukee, Wis. This office will be in charge of A. Q. Dufour, who has had long experience and training in the application of Jeffrey products.

St. Louis, Mo.—The Illinois Public Utilities Commission has ordered the Baltimore & Ohio Southwestern Ry. Co., to reduce its rates on soft lump coal from Breese and Beckemeyer, Ill., to Lawrenceville, Ill., and intermediate points. The new rate will be 55c. per ton.

Alton, Ill.—The Alton, Granite City & St. Louis Traction Co. has just completed at its Alton steam plant a storage pit for 30,000 tons of coal which it expects to store under 2 ft. of water. The pit is expected to hold coal enough for the operation of that plant for 60 days.

Big Creek, W. Va.—The Lincoln Coal Mining Corporation, of Fairmont and Big Creek, W. Va., is putting out a \$50,000 bond issue for the purpose of completing plant equipment and building additional houses in order to take care of the demands for coal which it is now receiving.

Thomas, W. Va.—The Bradford breaker of the Davis Coal & Coke Co. at this place was recently burned. The origin of the fire is unknown, but it is believed to have been incendiary and for the purpose of crippling the supply of coal to the byproduct ovens of the Bethlehem Steel Co.

Philadelphia, Penn.—The East Broad Top R.R. is erecting a new transfer station at Mount Union, Penn., for transferring coal from narrow gage to standard gage railroad cars. The new station will contain a Link-Belt shaking screen and picking table and will cost approximately \$45,000.

Buffalo, N. Y.—On and after Dec. 1 the Buffalo Foundry & Machine Co., manufacturers and builders of various varieties and types of chemical apparatus, driers, dry vacuum pumps, condensers, steamhammers, etc., will open an office in New York City in the Whitehall Bldg., at 17 Battery Place.

Philadelphia, Penn.—The Rock Hill Iron & Coal Co., 437 Chestnut St. Philadelphia and Huntingdon, Penn., will in the next few years spend approximately \$500,000 to double the production of the Broad Top mine. This firm is now driving tunnels, purchasing steam and electrical equipment, etc., to this end.

St. Louis, Mo.—Missouri Pacific Ry. schedules increasing carload soft coal rates from Kansas City, Mo., to Pittsburg, Kan., and between other points in Interstate traffic were suspended Nov. 20, by the Interstate Commerce Commission until Mar. 21, next. The increases range from 65c. to \$1.45 per ton.

Springfield, Ill.—Officers were recently elected by the Illinois Mining Institute as follows: President William Burton, Herrin; first Vice-President, Fred P. Haler, Belleville; second Vice-President, Patrick Hogan, Canton; Secretary and Treasurer, Martin Bolt, Springfield; Herrin was chosen as the place of next meeting.

Philadelphia, Penn.—George F. Lasher, William B. Whelen, and John Gilbert, trustees, of 147 No. 10th St., Philadelphia, wish to sell somewhat over 37,000 acres of Pocahontas coal, estimated as containing 242,000,000 tons. This tract lies in McDowell and Wyoming counties of West Virginia, and is provided with railroad facilities.

Cincinnati, Ohio.—The C. G. Blake Coal Co., consignor of the cargo of coal on board the steamer "Genesee," which was re-

cently seized by a British cruiser while bound for Montevideo, announces that it is fully protected in the matter by both ordinary and war insurance, and that the cargo, moreover, was legally the property of the consignee at the time of the seizure.

Uniontown, Penn.—A deal has been consummated between L. F. Ruth, J. M. Grey, K. K. Kremer, R. S. Matthews, E. K. Dick, all of Connellsville, whereby title to 400 acres of coal located in Morgan Township of Green County is acquired from W. R. Hawkins, and associates. The transaction involves an amount of approximately \$300,000, some of the coal bringing as high as \$800 per acre.

Detroit, Mich.—The Western Electric Co. has changed its Detroit headquarters from 263 Franklin St., to Kirby & Dequindre St. The new building is two stories high, and has a frontage of 150 ft., and a depth of 130 ft., and adjoins the Grand Trunk Ry. The change from the old quarters has been occasioned by healthy business growth which reached such proportions that the Franklin St. location became inadequate.

Baltimore, Md.—Contracts have been let by the Baltimore & Ohio for the construction of its new coal pier at Curtis Bay, Baltimore, which will cost approximately \$1,500,000. All the work will be started at once, it being expected that the new improvement will be ready for operation during the season of 1916. The pier will have a capacity of 10,000,000 tons a year and will be the largest structure of its kind ever planned.

Wheeling, W. Va.—It was announced here recently that navigation companies on the Great Lakes were unable to handle the large amount of coal now flooding the docks. It is expected that word will be received shortly to annul all shipments. The shipments of some railroads have fallen off recently due to the docks and lake ports being filled to capacity and lake freighters being held up on account of the weather.

Fairmont, W. Va.—The management of the Western Maryland Ry. Co., has had to increase its order for new equipment. A contract for 1,000 additional steel hopper cars has been placed with the Pullman Co., of Pullman, Ill. An order for 2,000 steel hoppers was given this same company about a month ago. It is stated that the railroad is doing an immense business, and that a year from now it expects to do twice as much as it is doing at present.

New York, N. Y.—The Standard Paint Co., manufacturers of P. & B. insulating tape, has placed upon the market a rubber friction tape under its IMP brand. This tape will not compete with, or in any way displace the P. & B. tape. It is treated with a rubber compound, and finished by the friction process, and it is suitable for all kinds of wiring work. The older P. & B. tape is especially adapted for severe atmospheric and weather conditions.

St. Louis, Mo.—R. W. Ropiequet, attorney for the Coal Operators Traffic Bureau of St. Louis has withdrawn complaint before the Interstate Commerce Commission, Docket No. 8,263, Coal Operators Traffic Bureau of St. Louis, Southern Coal, Coke and Mining Co., Lumaghi Coal Co. et al. Chicago, Burlington & Quincy R.R. alleging discrimination in differentials as between groups in Illinois. It is understood a satisfactory adjustment has been made.

St. Louis, Mo.—Officials of railroads operating eastward from Chicago and St. Louis report a heavy general tonnage, and some sections are short of cars. At the same time, the roads are hauling many empties westward. The great manufacturing districts reflect further activity, but aside from these influences there has been little change in the traffic situation on these lines during the past week. Officials of Southern roads report further gains in general tonnage which now is about 4 per cent. larger than in 1913.

Philadelphia, Penn.—The business of the Maryland Coal & Coke Co., in New England, that has heretofore been handled through the Boston office, will, in the future, be handled through the New York office. George E. Dunn, formerly New England agent at Boston, has been appointed manager of the New York office with headquarters at 17 Battery Place, New York City. William S. Johnson has been appointed assistant manager of the New York office. On or about Mar. 1 next, the company's office in Boston will be discontinued.

Birmingham, Ala.—The No. 4 furnace of the Sloss Shefield Steel and Iron Co. was blown in on Nov. 26. This furnace has a capacity of 250 tons per day, and with the four other furnaces in blast will give this concern an output of 1,250 tons per day of iron. This is the first time in many years that both furnaces of this company have been in blast at North Birmingham at the same time, but the condition of the iron market made it expedient to put another furnace into blast. This furnace was relined and overhauled before going into blast.

Barbourville, Ky.—The general contract for construction and track laying of the Cumberland & Manchester R.R. from the Louisville & Nashville R.R. at Barbourville, to Manchester, Clay County, has been let and work on construction has begun, the line to be completed by the first of next July. The line will have a total length of 24 mi. and will open a large bituminous and cannel coal field, besides making a billion feet of hardwood timber available for market. Charles F. Heidrick, of Brookville, Penn., and Barbourville, Ky., is president of the Cumberland & Manchester R.R.

Reading, Penn.—The final chapter in the history of the Temple Iron Co. was recently completed when the Temple Furnace was sold to H. H. Adams, representing New York interests. It was the charter of the furnace company granted many years ago by the state that permitted the formation of the many underlying companies which it was claimed constituted the so-called coal trust and which the Government ordered dissolved through the courts over a year ago. The mining properties of the company were sold shortly after the decree of dissolution was granted and the recent sale of the furnace completes the compliance with the order of the court.

Wilkes-Barre, Penn.—The Lehigh & Wilkes-Barre Coal Co. has sent the following circular to its customers:

The Supreme Court of Pennsylvania, on Oct. 28, 1915, declared unconstitutional the act of June 27, 1913, imposing a tax of 2½ per cent. on the value of anthracite coal prepared for market. When assured by the Commonwealth of Pennsylvania that no further proceedings will be undertaken to enforce payment of this tax, the amount of tax collected by this company, under the act, will be refunded. The tax now being added to the price of anthracite coal sold by this company is imposed by a later act of the Legislature of Pennsylvania, approved June 1, 1915, which supersedes, as of that date, the act recently declared unconstitutional. The validity of the later act has not been determined.

Sandusky, Ohio.—The Big Four R.R. Co. is now planning to spend approximately a million dollars or more on dock improvements at this place. Plans are being exhibited, and the first informal announcement relative to the matter was recently made. When these docks are completed, Sandusky will rank among the first of the coal shipping ports to the Great Lakes. Present plans provide for the reclamation of a large tract of shore land, and the erection of a car dump which will make it possible to load several freighters with coal each day. Toledo is now considered as being one of the largest coal ports on the lake, but it would appear that in a few years Sandusky will be a close rival.

Birmingham, Ala.—The Pratt Consolidated Coal Co., will inaugurate barge service for the transportation of coal from Cordova to Mobile on the Warrior River as soon as specially constructed barges are available. A contract has just been awarded for the construction of 10 barges to a Mobile shipbuilding concern. These barges will be built under special design of the company and will cost several thousand dollars each. The company is now operating a weekly barge service on the Warrior River from Maxine to Mobile. The greater facilities for handling coal on the Warrior River due to construction of the 10 new barges and the increased river traffic that will result, are expected to have a bearing on the freight rate situation in Alabama.

Philadelphia, Penn.—An increase of more than 40 per cent. in coke shipments is the feature of the report of the coal and coke tonnage carried on the lines of the Pennsylvania R.R. east of Pittsburgh for October. Coke tonnage for that month totaled 1,225,848 tons, a gain of 509,838 tons over the same period last year. The carriage of anthracite aggregated 1,084,739 tons, or 37,399 tons ahead; bituminous coal shipments amounted to 4,304,466 tons, an increase of approximately 7 per cent. Aggregate fuel shipments in October amounted to 6,615,053 tons. Since Jan. 1 these three commodities have furnished tonnage to the amount of 54,275,580 tons. Only in coke, however, has an increase been registered in the 10 months' shipments over those of a year ago. In this respect coke has shown a gain of 1,326,556 tons.

Belleville, Ill.—A deed for the transfer of six coal mine properties, three in St. Clair County and one each in Perry, Washington and Randolph Counties, was filed in the recorder's office at Belleville recently. The deed is made by the Bessemer Washed Coal Co. to the Bessemer Coal and Mining Co. and the consideration is fixed at \$127,700. The transfer includes the Bessemer coal-washing plant south of East St. Louis. The new company's main office will be in St. Louis. The mines in St. Clair County turned over are the Lenzburg, Marissa, Advance, and New Oak Ridge mines, all on the Illinois Central Ry. south of Belleville. Leases on about 2,000 acres of coal land are included. William Stevenson, of Tilden, Ill., secretary of the new company, said the plan is to absorb the overhead charges of all the mines by one management and operate all the properties, including the washer in East St. Louis.

Coal Trade Reviews

General Review

Anthracite trade uncertain and hinging on weather conditions. Railroad embargos force bituminous buyers to cover. Exports at a standstill. Closing of Lake navigation finds the market strong. Cold snap causes an urgent demand in the Middle West.

Anthracite—The situation in the hard coal trade is indeterminate, fluctuating almost daily according to weather conditions. Supplies at the principal distributing centers are obviously small, and a sharp decline in temperature, sustained over any appreciable period, would undoubtably result in a critical situation. The car supply outlook is growing more ominous each day and some of the large companies have already been forced to draw on their storage supplies for the prepared sizes. At the present time the market hinges on the inadequate transportation facilities and any deficiency in supplies that develop at this time will be exceedingly difficult to overcome later in the season. The full company circulars are generally well maintained in spite of the relatively poor demand.

Bituminous—The reactionary tendency in the soft coal market has been wiped out by further unfavorable developments in transportation circles which has steadied up the market in a satisfactory manner. Sales agencies have placed a decidedly pessimistic construction on the announcement of the recent embargoes by a number of the leading trunk lines. The supply shows no increase and some of the best-protected sellers have been forced into the prompt market for tonnages to fill out gaps in their contract obligations. Hopes for some relief are anticipated when Lake navigation ceases, it being estimated by some that 25,000 cars will be released for other uses. Storms and heavy weather, combined with the shortage of vessel tonnage, have seriously interfered with the coastwise movement.

Exports—As a result of the combined effects of the unprecedented high ocean freights and the submarine warfare in the Mediterranean, shipments to Italian ports seem to have dropped off completely. Vessel rates continue to advance with monotonous regularity and each week finds them firm at new high levels. A few steamers are still being chartered, but this business can only be done where prospective shippers have firm orders on hand. The movement over the Hampton Roads piers for last week showed a gratifying increase, though still substantially below recent averages; shipments from other points have touched the lowest figures for several years.

Lake Markets—The Lake markets have stood up under the effects of the cessation in Lake shipping in unexpectedly good form. Sellers are in definite control of the prompt market, prices in which are firm with a buoyant tendency. Occasional odd tonnages of coal, diverted from the Lake trade, are subject to some pressure, but not of sufficient proportion to affect the general situation. The final Lake shipments were considerably delayed and irregular as a result of heavy storms, which accentuated the scarcity of vessel tonnage, but in spite of this there was a sharp rush at the close of navigation, receipts at the upper ports being unusually heavy. Railroad embargoes have persisted, and while no actual shortage has resulted as yet, there are some districts entirely cut off from shipments, in which difficulties will be experienced shortly.

Middle West—The recent lower temperatures have precipitated a flood of wire orders from outlying districts urging prompt shipments, which substantiate recent opinions regarding small stocks in the hands of the retailers. Many operators are sold up to their full rated capacity for 30 days ahead and report orders steadily increasing as the season advances. Screenings have stiffened up notably, while other grades are showing a strong disposition to act in sympathy. The steam demand is expanding in an impressive manner, while car and labor shortages continue impelling factors on the constructive side of the market.

A Year Ago—Warm weather threatens the anthracite market with a general slump. Bituminous situation dull and no improvement in sight. The Middle Western market beginning to stiffen up noticeably.

BUSINESS OPINIONS

Boston News Bureau—The situation in its entirety is acting as one would suppose it would in view of all the existing conditions. General trade is demanding more thought and attention, and this has the call over all other considerations. This country never saw such a combination of favorable features before in its history. With the new year we should witness an activity far above any previous estimate, spreading to every line of trade. New financing is occupying the attention of the financial interests to the exclusion of the stock market. The convening of Congress naturally modifies somewhat optimistic sentiment. But there is much that Congress can do to help confidence.

Iron Age—The pressure from manufacturing consumers for protection on contracts they have taken has led producers to book considerable finished material in the past week for the third and fourth quarters of 1916. The higher prices asked did not deter the buyers, plates and shapes for cars being sold at 1.85c., Pittsburgh, as against 1.70c. on first-half contracts. New export business has been checked by the action of leading producers in refusing offers from abroad of several dollars a ton above domestic prices, also by the railroad embargo and the stringency in the ocean freight situation.

Bradstreet—Nearly every prospect seems to please, and a year that started under a cloud of uncertainty or depression is ending with productive energies moving at high speed. This week's reports, reflecting as they do cumulative growth in trade and industry, display a marked degree of snap, the situation in general being the best noted for a long time past. Misgivings as to the immediate future are negligible, in the leading industries operations are being pushed to the utmost, labor is scarcer and payrolls are heavier.

Dun—Widely divergent lines in all sections reflect a sustained growth in business movements and volumes. Manufacturing operations still broaden, with overtime in force in many instances, while retail distribution steadily enlarges under the stimulus of increased payrolls and continued low temperatures. As the season advances, holiday goods become a more conspicuous feature and there is every indication that results in this particular branch will prove exceptionally gratifying.

Southern Lumberman—Price changes during the past week are again few, though there has been a somewhat larger spread in prices received by the various mills according to the stocks on hand at those mills. Somewhat higher prices than those quoted are reported by some mills, particularly Alabama operations, on certain items of dressed stock, while a very occasional report is made of a somewhat lower price offered on particular items by other mills.

Dry Goods Economist—Firmness, with a seasonable degree of activity, characterizes practically all of the dry goods lines. The prospects for an unusually large Christmas business are filling most retailers with optimism. The cotton market has been quiet, but firm. Exports of raw cotton for the nine months ending Sept. 30 last, reached a value in round numbers of \$300,000,000 against \$242,000,000 for the corresponding period of last year. Raw wool continues firm.

American Wool and Cotton Reporter—Although a smaller volume of sales was consummated during the past week because dealers have marked up prices, the wool market remains fully as firm as it has been for several weeks. So much wool has been taken and as there are several shortages what wool is left will bring high prices. By Jan. 1 it is expected that stocks will be light. Woolen mills are very busy with orders booked several months ahead, and it is stated that one manufacturer has a year's business to take care of.

Marshall Field & Co.—Current wholesale distribution of dry goods has exceeded the record of the corresponding period of a year ago by a considerable margin. Road sales for immediate and future delivery have been greater than for any year since 1909. Customers have been in the market in about equal numbers. Collections are above normal. Prices are firm.

ATLANTIC SEABOARD

BOSTON

Weather interferes with shipments from Hampton Roads. On car prices higher because of water freights, but canvass for next year contracts at minimum figures. Georges Creek receipts light. Pennsylvania coals easier. Delays on anthracite.

Bituminous—Storms and thick weather have practically deadlocked shipments along the coast. Boats are in very short supply and there is apprehension over the outlook a month or two hence. At the same time New England probably has better stocks than other sections. Prices on Pocahontas and New River show no change f.o.b. with an ample tonnage standing at all the piers. No spot market of any consequence has developed, f.o.b. Hampton Roads, and there is not likely to be any until marine transportation gets somewhat straightened out.

On cars at Boston, Providence and similar points prices have advanced materially on account of higher water rates, but inquiry so far is confined largely to distributors who are buying to keep customers going until cargoes arrive.

The canvass for contracts from Apr. 1, 1916, is still on; \$3.30 on cars Mystic Wharf, Boston, is the lowest price yet heard, although this was for fairly large tonnages. Smaller contracts are being closed at \$3.40@3.50. A few more good sized orders have been closed on a delivered basis and it begins to look as if the usual contract season next February or March would be conspicuous by its absence. A lot of quiet work has been done and so keen is the rivalry for tonnage that most buyers are likely to get their fuel at lower prices than for several years.

Receipts of Georges Creek by water are also being hampered by the weather, but no scarcity is felt as yet. Deliveries all-rail are coming through very slowly.

Higher prices on the Pennsylvania coals are bringing out many offers of spot coal. The shippers of the higher grades are limiting their shipments to contract business, preferring to get some of their obligations behind them now and have their free coal later, if at all, when prices are expected to be even higher. Car supply is little if any improved on most roads and some of the largest buyers are being forced into the market for coal known to be at or near the transfer points; \$1.75 is about the price for the better Cambrias and Somersets, while almost any of the Clearfields, if spot, will command \$1.35@1.50.

Water freights have further advanced to \$1.25@1.35, Hampton Roads to Boston, on large vessels, but with few bottoms offering; \$1.20 has been paid Norfolk to Providence, other rates in proportion, while 60@70c. is the range from New York ports to Providence and New Bedford, with an active demand.

Anthracite—The shipping companies are being flooded with orders, particularly since buyers have become aware of the delays in getting cargoes off. It is a shortage of transportation rather than coal, and when one to two trips are lost it is hard to make good the deficiency so late in the season. The outlook is excellent for brisk trade throughout the winter.

Bituminous quotations, f.o.b. loading ports at points designated, are about as follows:

	Philadelphia	New York	Baltimore	F.o.b. Mine
Clearfields.....	\$2.50@3.00	\$2.75@3.30	.....	\$1.25@1.75
Cambrias and Somersets.	2.60@3.05	2.90@3.35	.....	1.35@1.80
Georges Creek.....	2.92@3.25	3.22@3.55	\$2.85@3.18	1.67@2.00

Pocahontas and New River prices, on cars Boston, are \$3.75@3.90; Providence, \$3.75@3.85; and f.o.b. loading ports at Hampton Roads, \$2.80@2.85.

NEW YORK

Warmer weather causes anthracite demand to ease up. Tidewater docks generally bare of coal. Steam coals active. Bituminous short and prices increasing. Coal delayed in delivery. Free coals bringing \$3 f.o.b.

Anthracite—The hard coal is quiet, but supplies are so short that a sudden demand would result in a serious situation. Present conditions are the exception for this time of the year; the car shortage seems to become more acute and this, together with the shortage in the year's production, has resulted in an unusual situation. Complaints of lack of cars are increasing. Most individual operators have sufficient orders to carry them over several weeks, but they are seriously handicapped by the inadequate car supply. The local roads continue badly congested.

Most wholesale dealers are short of coal, while large retailers, who as a rule need not worry about shipments,

are making inquiries as to the situation and the prospects. Egg coal is the only prepared size offering at less than full circular. Straight cargoes of stove coal bring slight premiums and chestnut is moving well. The steam grades are active and prices remain firm. Buyers of the buckwheat coals are being advised to store all they possibly can get at prevailing prices.

Current quotations, gross tons, f.o.b. Tidewater, follow:

	Lower Ports		Upper Ports	
	Circular	Individual	Circular	Individual
Broken.....	\$5.05	.....	\$5.10	.....
Egg.....	5.30	\$5.20@5.30	5.35	\$5.25@5.35
Stove.....	5.30	5.30@5.30	5.35	5.35@5.35
Chestnut.....	5.55	5.55@5.55	5.60	5.55@5.60
Pea.....	3.50	3.45@3.50	3.55	3.50@3.55
Buckwheat.....	2.75	2.45@2.75	2.80	2.45@2.80
Rice.....	2.25	1.95@2.25	2.30	2.00@2.30
Barley.....	1.75	1.50@1.75	1.80	1.75@1.80

Bituminous—Prices continue to advance and still higher figures are looked for. Arrivals are greatly delayed by the congestion along the various trunk lines and there is little free coal at the docks. Operators last week obtained about 60% of the usual car supply. Little coal is being stocked, all the available supply being applied direct to contracts. Free coals are snapped up quickly and there is little to be had by the spot buyer. The cheaper grades are bringing from \$2.90 to \$3 f.o.b., and mine prices have advanced correspondingly. Some of the better grade coals are practically out of the market. Slack continues strong at from \$1.05 to \$1.15 with occasional quotations of 10c. higher.

Water freights are strong. The first of the week they had touched \$1.05 to Sound points, while an average of 25c. was quoted around the harbor.

Current quotations, gross tons, f.o.b. Tidewater, are about as follows:

	South	Port	Reading	St. George	Mine
	Amboy	Reading	St. George	Price	
Georges Creek Big Vein.	\$3.20@3.30	\$3.20@3.30	\$3.20@3.30	\$1.75@1.85	
Georges Creek Tyson....	3.20@3.30	3.20@3.30	3.20@3.30	1.65@1.75	
Clearfield:					
Medium.....	3.00@3.05	3.00@3.05	.....	1.45@1.50	
Ordinary.....	2.90@3.00	2.90@3.00	.....	1.35@1.40	
Broad Top Mountain.....	.....	.....	.....	1.25@1.45	
Cambria County:					
South Forks.....	3.20@3.30	.....	.....	1.65@1.75	
Nanty Glo.....	3.20@3.30	.....	.....	1.65@1.75	
Barnesboro.....	3.10@3.20	.....	.....	1.60@1.70	
Somerset County:					
Quemahoning.....	.....	3.20@3.30	3.20@3.30	1.65@1.75	
Medium.....	3.00@3.20	3.00@3.20	3.00@3.20	1.50@1.65	
Latrobe.....	2.90@3.00	.....	.....	1.35@1.45	
Greensburg.....	2.00@3.10	.....	.....	1.35@1.45	
Westmoreland.....	3.20@3.30	.....	.....	1.45@1.55	
West Virginia Fairmont:					
Fairmont mine-run.....	2.90@3.00	2.90@3.00	1.10@1.20	1.00@1.10	
Steam.....	2.90@3.00	2.90@3.00	1.35@1.45	1.35@1.45	
Western Maryland.....	2.90@3.00	2.90@3.00	1.35@1.45	1.35@1.45	

PHILADELPHIA

Anthracite moving steadily. First storage coal shipped. Stove leads prepared sizes, with chestnut beginning to show strength. Egg weak. Heavy shipments of pea. Car shortage advances bituminous prices. Some relief expected when Lakes close. Exports quiet.

Anthracite—Business is moving along steadily. There has been very little price cutting in the wholesale market, but the retailers have shown very little inclination to increase their prices. Pea coal which continues the main point of attack will surely cost the dealers at least 25c. per ton more after Dec. 31. Most of the large dealers will go into the new year with capacity stocks of this size bought at the low price and it is hoped that the price-cutters will not sacrifice this advantage.

Considerable storage coal has come to this market, especially from one of the larger companies. Another big company has also been sending large quantities of storage pea and buckwheat to market, the former due to the approaching advance in price, and the latter due to the increasing demand from steam users. Storage yard coal is not usually in much favor, but the prepared grades which have been shipped were re-screened and washed.

Collections continue satisfactory, both the wholesale and retail houses giving them careful attention. Sales by the price-cutters are for cash only; it has been the practice with a good many of the better firms, to sacrifice 25c. per ton for cash. It seems strange, however, that no matter how notorious for poor pay either a dealer or consumer has become, there is always a shipper or dealer who will take a chance.

The demand for broken coal continues and all that not sold on contract at \$3.25 and tax is bringing the full price of \$3.50 and tax; it is also rumored that there will be made an advance of from 10c. to 20c. per ton on new contracts.

At present egg seems to be the weak spot and even small sales were recently made at from 15c. to 25c. off circular.

Stove is probably the leader of the prepared sizes and seldom sells off price. Chestnut grows more popular as the season advances and while slight concessions are occasionally made the good grades are up to the full circular.

Pea is certainly in strong demand and the dealers protected until Dec. 31 at the \$2 and tax rate are putting away every car they can and in many instances the stocks of the large sizes are being reduced and the extra bin room devoted to the pea size. This naturally lessens the demand for the larger sizes though the bins will be refilled soon after the first of the year.

The prices per gross ton at the mines and f.o.b. Port Richmond for tide shipments are as follows:

	Line	Tide		Line	Tide
Broken.....	\$3.50	\$4.75	Pea.....	\$2.50	\$3.25
Egg.....	3.75	5.00	Buckwheat.....	1.50	2.25
Stove.....	4.00	5.00	Rice.....	.85	1.75
Chestnut.....	4.15	5.25	Barley.....	.50	1.50

Bituminous—The market continues to be dominated solely by the car supply and there is a gradual creeping up of prices toward the \$2 mark. While there was apparently no general increase this week, yet new prices were asked for a number of the better grades. The principal change was in Georges Creek, which advanced from 10 to 15c.

The demand for fuel continues good, with supplies difficult to get, as many shippers state they are only receiving from 27% to 40% of the cars needed at their mines. The only hope of early relief is held out in the fact that usually in December of each year there is an easing up in the car supply owing to the closing of navigation on the Lakes, which will release about 25,000 cars. The export trade continues quiet.

The prices per gross ton at the mines have ruled about as follows:

Georges Creek Big Vein.....	\$1.85@2.00	Fairmont gas, $\frac{1}{4}$	\$1.35@1.45
South Fork Miller Vein.....	1.65@1.75	Fairmont gas, mine-run.....	1.20@1.25
Clearfield (ordinary).....	1.40@1.50	Fairmont gas, slack.....	1.00@1.10
Somerset (ordinary).....	1.40@1.50	Fairmont lump, ordinary.....	1.15@1.20
West Va. Freeport.....	1.35@1.40	Fairmont mine-run.....	1.05@1.10
		Fairmont slack.....	1.00@1.10

BALTIMORE

Export trade flat. Car movement poor and contracts are back. Indifferent demand keeps prices low.

Lack of vessel bottoms and impossible freight rates of from \$18 to \$20 a ton to Mediterranean ports, and in proportion to other points, has killed the export coal movement for the time being. The past week saw a total of but 1,135 tons loaded here for foreign delivery, the smallest in several years.

Operations in the Fairmont and Somerset districts have been down to not more than a 30% capacity due to poor car supply. Most operators and middlemen are now behind on their contract obligations. Practically all unattached coal is being taken up to fill in gaps on contracts.

Prices in gross tons to the trade may be quoted about as follows:

Mines	Balt.*	Fairmont	Mines	Balt.*
Geo. Crk. Big Vein	\$1.80	\$2.98	Ordinary mine run	\$1.00
Geo. Crk. Tyson...	1.50	2.68	Ordinary $\frac{1}{4}$	1.10
Clearfield.....	1.30	2.48	Ordinary slack.....	.95
South Fork.....	1.45	2.63	Low sulphur mine.....	
Latrobe.....	1.25	2.43	run.....	1.25@1.30
Somerset (best)...	1.45	2.63	Low sulphur $\frac{1}{4}$	1.40
Somerset (good)...	1.25	2.43	Low sulphur.....	2.83
Quemahoning.....	1.50	2.68	slack.....	1.00
Freeport.....	1.20	2.38	* F. o. b., outside Capes.	2.43
Miller Vein.....	1.30	2.48		

Anthracite sales have been increased by cooler weather, and arrivals have been rather slow due to lack of cars.

HAMPTON ROADS

Movement foreign and coastwise light. Government takings small. Demand from Italy shows a big decline.

Shipments from Hampton Roads have been anything but satisfactory. The movement both coastwise and foreign has been light and the government takings were small. The largest cargo of the week was taken care of by the Panama Collier "Achilles" and went to Cristobal. The demand from Italy seems to have dropped off completely and due to the submarines in the Mediterranean and the high freight rates. Most of the coastwise movement has been to Boston and Providence. There have been few government ships in port; government takings have been light especially as regards barge loading.

Railroad Tonnages—Dumpings over the local piers for the past five weeks compare as follows:

Railroad	Week Ending				
	Oct. 30	Nov. 6	Nov. 13	Nov. 20	Nov. 27
Norfolk & Western....	126,145	120,590	133,329	100,598	118,065
Chesapeake & Ohio....	74,028	78,210	70,282	67,209	93,924
Virginian.....	78,237	46,952	72,888	39,485	54,591
Totals.....	278,410	245,752	276,499	207,292	266,580

Ocean Charters, Clearances and Freights

OCEAN CHARTERS

The following charters have been reported from various sources during the past week:

PHILADELPHIA

Vessel	To	Tons	Rate	Vessel	To	Tons	Rate
New Orleans	Cienfuegos	1,017		Waltham	Cienfuegos	449	
Eurasia	Italy ¹	1,742					
G. E. Warren	Cienfuegos	3,700	3.50				
E. F. Bartram	Buenos Aires	1,600	9.00	R. B. White	Cardenas	412	3.10
Thelma	Cienfuegos	846	3.50	E. Sewell	Buenos Aires	2,125	8.00
T. Menier	La Romana	794		S. Palmer	Buenos Aires	9.00	
R. McCurdy	Surinam	602	5.15	E. B. Winslow	Rio Janeiro	2,357	8.25
	West Coast			R. E. Merrill	Rio Janeiro	2,482	
				J. E. du Bigon	Puerto Cabo	2,309	
					bello	468	5.00

VESSEL CLEARANCES

The following steamers have cleared from various ports during the week ended Nov. 27:

NORFOLK

PHILADELPHIA—Continued

Vessel	Destination	Tons	Vessel	To	Tons
B. Palmer ²	Argentine	3,802	Leesport ¹⁰	Lynn	
Achilles ³	Cristobal	12,032	Tohickon ¹⁰	Milton	
Selene ⁴	Genoa	4,985	Lovland ¹	Cienfuegos	
F. Barrett ⁵	San Juan	2,705	Preston ¹⁰	Brewer	
Macungie ⁶	Rio de Janeiro	6,005	Yardley ¹⁰	Bangor	
Baxter, Jr. ⁷	Para	4,000	Rutherford ¹⁰	Bangor	
Josey ⁸	Havana	3,159	Kchnoor ¹⁰	Brockline	
			Indian Ridge ¹⁰	East Boston	
			Comru ¹⁰	East Boston	
Berwindmoor ⁹	Havana	8,087	Temple ¹⁰	Portland	
Chiswick ¹	Trinidad	4,580	Eagle Hill ¹⁰	Portland	
Tancred ⁶	St. Lucia	5,498	Spring ¹⁰	Portland	

PHILADELPHIA

BALTIMORE

Andreta	Mediterranean	Sangstead	Honduras	411
J. J. Cuneo	Cuba	Waltham	Cuba	724
Ashland ¹⁰	Lynn			
Mingo ¹⁰	Boston			
Merriam ¹⁰	Boston		Canada	1,032
Franklin ¹⁰	Bangor		Venezuela	13
Paxtang ¹⁰	Bangor		Canada	7,529
Macungie ¹⁰	Bangor		New Foundland	2,260
Ocland	Port de France	1,874	Trinidad	30
Rio Presto	Santos		Santo Domingo	831
Lincoln ¹⁰	Portland		Spain	2
Marion ¹⁰	Bangor		Canada	1,534
Bathayres ¹⁰	Bangor		Chile	143
Ulrik	Santiago		Mexico	143
Wellington	Havana		Argentine	349
Reading	Boston		Canada	23
F. Pritchard	Boston		Santo Domingo	5
Geo. E. Warren	Bangor		British West Indies	50
Ephrata ¹⁰	Boston		Canada	14

¹ Berwind White. ² C. G. Blake Co. ³ W. A. Atwater. ⁴ Flat Top Fuel Co. ⁵ Baker Whiteley. ⁶ W. Va. Coal Co. ⁷ Smokeless Fuel Co. ⁸ New River Coal Co. ⁹ C. & O. Coal Agency. ¹⁰ Phila. & Reading Coal and Iron Co.

OCEAN FREIGHTS

At \$4.50 per quarter (which is about \$18 per ton) on grain to the West Coast of Italy and Mediterranean, rates are firm and advancing. South American rates are practically the same as a week ago, while rates to the West Indies are firmer. We have chartered a few steamers for export coal since our last report, but none of these fixtures have been reported. The only way in which coal chartering can be arranged is by shippers getting orders firm in hand, so that they are in position to make positive offers, and although tonnage is more than scarce, occasionally steamers can be obtained if shippers can pay market rates. In some instances we have been obliged to charter steamers on time charter, as we could not arrange charters for shippers on a satisfactory rate basis.

We would quote freight rates on coal by steamer as follows:

To	Rate	To	Rate
Havana.....	\$2.75@3.25	Bermuda.....	\$3.50@ 4.00
Cardenas or Sagua.....	3.00@3.50	Vera Cruz.....	5.00@ 6.00
Cienfuegos.....	3.25@3.75	Tampico.....	5.00@ 6.00
Port au Spain, Trinidad.....	4.25@4.50	Rio.....	10.80@11.40
St. Lucia.....	4.00@4.50	Santos [*]	11.40@12.00
St. Thomas.....	3.75@4.00	Montevideo.....	12.00
Barbados.....	4.25@4.50	Buenos Aires or La Plata [†]	12.00
Kingston.....	3.75@4.00	Rosario.....	13.20
Curacao.....	4.00	West Coast of Italy.....	21.60
Santiago.....	3.50@4.00	Barcelona [*]	19.20@20.40
Guantanamo.....	3.50@4.00	Valparaiso or Callao.....	11.00@12.00
Demerara.....	6.00@7.00	Marseilles.....	20.40@21.60

^{*} Consignees paying dockage dues. ^{**} Spanish dues for account. [†] Quotations on Plate coal by British steamers; neutral steamers are more difficult to obtain and the rates are always higher.

W. W. Battie & Co.'s Coal Trade Freight Report.

Note—Figures in bold face type are only approximate.

LAKE MARKETS

PITTSBURGH

Prompt coal steady; contract coal higher. Car shortage threatening and weather unfavorable for car movement. Three-month contract at \$1.22½.

The market for prompt coal has suffered no setback on account of the termination of Lake shipments, as conditions in general have improved, as to consumptive prospects, and cars have become very scarce. These influences have naturally affected the contract market for contracts up to Apr. 1, and prices on contract have stiffened very decidedly. It is the universal view in the trade that coal prices will stiffen after December, and even fancy prices would not be surprising for March. Contracts that involve the immediate commencement of shipments, so as to include December, are therefore more eagerly sought than contracts involving merely the first three months of the new year. On a contract involving 1,000 tons a day of mine-run, December to March inclusive, \$1.22½ has been done, but this is regarded as below the current market, even for shipment beginning Dec. 1.

The car shortage is more pronounced and trouble is experienced at nearly all mines, but the influence has been to make the market sensitive rather than actually to advance it. Reports are that at some points the congestion is being relieved, but on the other hand the weather this week turned bad, promising more trouble for the railroads. The domestic demand may be expected to improve in the next fortnight as real winter weather is promised, against the unseasonably mild weather lately prevailing.

Slack has stiffened sharply and is not available at under about 95c. for prompt and \$1 on contract to Apr. 1. We quote prompt coal as follows: Slack, 95c.; nut, \$1.15; mine-run, \$1.15@1.20; ¾-in., \$1.25@1.35; 1¼-in., \$1.35@1.45; contract to Apr. 1: Slack, \$1@1.05; nut, \$1.25; mine-run, \$1.25@1.30; ¾-in., \$1.35@1.40; 1¼-in., \$1.45@1.55, per net ton at mine, Pittsburgh district.

BUFFALO

Stronger market for bituminous. Eastern demand improved greatly. Canada still buying very little. Overconfidence caused increase of coal on track. Anthracite quiet, due to warm weather.

Bituminous—There is a distinctly better feeling in the trade. Where the shipper can reach Tidewater the demand is strong and the coal moves briskly. Markets southward and on the coast continue more active than here, though the late improvement here now places this market in a strong position. At the same time the slackness in Canada will continue to affect Buffalo, though jobbers are finding a good trade in Boston and westward, practically all the way through the state.

At the same time there has been too much coal on track here of late. Certain Lake shippers have diverted coal here which they have been offering at low figures, though there has not been sufficient to affect prices. There has also been some coal here from south of Pittsburgh that pays a \$1.40 rate.

Prices are somewhat stronger than a week ago, but figures are unchanged, as follows:

	Pittsburgh	Allegheny Valley	Penn Smokeless
Lump.....	\$2.80	\$2.50	\$2.55
Three-quarter.....	2.65	2.30	...
Mine run.....	2.55	2.20	2.30
Slack.....	2.15	1.90	2.30

Quotations are f.o.b. cars at Buffalo or the Niagara bridges and per short ton except east of Rochester or Kingston, Ont.

Conditions will be more or less disturbed now till the winter movement is established.

Anthracite—There is not much life to the market, owing to the warm weather. The shortage of chestnut is the feature of the trade; it is said to be quite as pronounced as it ever was before the price was advanced and shippers are offering stove size instead, though the substitute is not very acceptable. As the warm spell is extended, there is more fear that when winter does set in there will be a rush that cannot be met. There is much complaint on the part of independent anthracite shippers that they are not able to get box cars.

The local trade is quiet, but improves rapidly whenever the weather increases in severity. Shipments by Lake continue good, being 103,300 net tons for the week. Buffalo prices remain as follows per long ton, f.o.b. cars: \$5.60 for grate, \$5.85 for egg and stove, \$6.10 for chestnut, \$4.30 for pea, with 25c. additional for loading on board vessel.

COLUMBUS

Strength of small sizes the feature of the trade. Prices 10 to 15c. higher and in some cases even more. Domestic demand better.

The trade has been fairly active, especially the steam sizes, which are stronger all along the line. Domestic demand is also better, due to lower temperatures. The tone of the market has been good and future prospects are bright.

Manufacturing is growing more active, and fuel requisitions are correspondingly increasing. Railroads are taking a larger tonnage. Car shortage is more marked and West Virginia mines are working only 50 to 60% of the average. This should help the local market as roads in this state are better able to move coal. The holiday of last week cut into the tonnage although the production was fairly large. There is a good demand for the fancy grades and there is a disposition among retailers to stock up in anticipation of a rush.

The Lake trade is about over although a few cargoes are still to be loaded. On the whole the Lake season was not as active as in some former seasons the Sunday Creek Coal Co. having shipped no Lake coal at all though other Ohio operators shipped a fair tonnage. The Hocking Valley docks at Toledo have loaded 2,543,000 tons since the opening of navigation.

Anthracite demand is increasing as the winter approaches.

Prices in Ohio fields f.o.b. mines, per short ton, are as follows:

	Hocking	Pomeroy	Eastern Ohio	Kanawha
Re-screened lump.....	\$1.60	\$1.65	...	...
Inch and a quarter.....	1.50	1.50	\$1.35	\$1.50
Three-quarter-inch.....	1.35	1.40	...	1.35
Nut.....	1.25	1.30	...	1.25
Mine-run.....	1.15	1.20	1.05	1.10
Nut, pea and slack.....	.80	.85	.75	.70
Coarse slack.....	.70	.75	.65	.60

Mines have been working at about the following percentages of full capacity:

District	Week Ended				District	Week Ended			
	Nov. 6	Nov. 13	Nov. 20	Nov. 27		Nov. 6	Nov. 13	Nov. 20	Nov. 27
Hocking...	60	50	60	50	Cambridge...	70	70	75	70
Jackson...	45	40	45	40	Massillon...	70	70	75	60
Pomeroy...	85	85	85	80	Eastern O...	80	75	80	75
Crooksville	65	65	65	60	Average...	68	65	69	62*

*Decline due to Thanksgiving Day holiday.

TOLEDO

Trade optimistic. Delays in transportation the most serious difficulty. Lake season practically closed.

There is an optimistic spirit among dealers. The only difficulty is the traffic congestion and it is believed that this will be relieved. Domestic business has been greatly stimulated by the cool weather of the past several weeks. Retailers have been very busy and the wholesalers and jobbers have felt the effects of the heavier buying. Steam prices are firm at close to the list. The Lake season is practically over although there is still some little movement.

CLEVELAND

Retail business active due to colder weather and snow. Steam coal in fair demand with light receipts. Closing of the Lake market has increased supply of coarse coal.

The fine-coal market is fairly well cleaned up with prices firm. Receipts are not very heavy as contract business is good. The shortage of cars is reducing arrivals, and Lake coal mining is practically over although loading of storage coal may follow.

Coarse coals are not moving well and domestic sizes of some grades, particularly Pocahontas, are none too strong at quotations. Jobbers have bought Pocahontas lump and egg at \$1.90, mines, although the usual run of prices is 5c. higher.

Quotations are as follows to jobbers f.o.b. Cleveland per short ton:

	Poca-hontas	Youghio-gheny	Bergholz	Wainwright	No. 8
Freight.....	\$1.45	\$1.00	\$0.70	\$0.70	\$0.90
Lump.....	3.40@3.45	...	...	...	...
Lump, 6 in.....	...	2.30	2.10	2.25	2.05
Lump, 1½ in.....	...	2.20	2.00	2.00@2.10	1.90
Lump, 3 in.....	...	...	...	2.40	...
Egg.....	3.40@3.45	...	...	...	...
Mine run.....	2.70	2.10	1.90	1.90	1.80
Slack.....	1.95	1.80	1.80	1.80	1.80

DETROIT

Demand for steam coal well sustained. Domestic grades softer due to warmer weather. Grand Trunk embargo reduces anthracite supply. Lake trade nearly over.

Bituminous—Steam coal users show little disposition to build up reserve stocks though buying continues to improve in spite of the fact that orders are for moderate tonnage. There is every indication of a steady consumption, which it is believed will continue. The demand for small sizes is still the

most active. Higher temperatures have restricted the sale of domestic coal but the market is rather active and shippers are anticipating larger orders soon. There is not much consignment coal on tracks and forced sales infrequent. Car shortage in sections is causing delays in delivery.

More serious, however, is the embargo which the Grand Trunk has renewed for another week. This has shut off hard coal shipments over the company's tracks and has also cut off the movement of soft coal from Toledo. It is reported that about 900 carloads of coal are held up outside of Detroit, while other roads serving Detroit are forced to give track storage to 500 or more carloads of freight, including coal, the consignees of which are on Grand Trunk tracks. While no actual shortage is so far reported, many of the yards served by the Grand Trunk are said to be running very low on stock. It is feared the embargo may be continued indefinitely.

Lake Trade—Lake shippers are finding it increasingly difficult to charter vessels, particularly for ports on Lake Michigan. Rates on grain and iron ore are maintained at a figure which stimulates effort at speed in getting ships back to loading ports, while delays due to storms have made quick dispatch more imperative, leaving few vessels obtainable for coal.

CINCINNATI

Lack of sustained cold weather creates a general sluggishness though prices are firm, due to the car shortage.

There has not been any really cold weather, so that the demand for the prepared grades is still abnormally low. Dealers' stocks have apparently not been sufficiently reduced to force them into the market to any extent. With a relatively light industrial demand as well, the market would be in a bad position were it not for the pronounced shortage of cars. Only severe winter weather for a somewhat protracted period will stimulate any general activity.

LOUISVILLE

Domestic grades weak but steam sizes are strong.

The Kentucky market is weak and long on domestic, though there are short stocks in the retailers hands. The steam-coal market is strong, with demand really ahead of the supply, which accounts for the over-production of the domestic grades. There are prospects for a flurry of some proportions in the screenings market.

Quotations in the Eastern field range all the way up to \$2.40 for fancy block, although it is said that sales are below the quoted price in some instances. In western Kentucky the bulk of the lump is going at \$1.25 or thereabouts. Sales in the Eastern field have been made during the week, long ton basis, f.o.b. mines, at from \$1.60 to \$2, and in special cases upward, on block and from \$1.10 to \$1.40 for egg.

BIRMINGHAM

The past week has shown very little change in the coal market, either on steam or lump coal. Steam coal is in slightly better demand, owing to the railroads taking larger tonnages on their contracts, in anticipation of a possible car shortage during the winter months. On the whole, the market is satisfactory on both grades and the prospects are encouraging for a steady business during the next sixty days.

COKE

CONNELLSVILLE

Market not well defined, demand being light. Foundry coke demand fair, with stiff prices compared with furnace grade. Production and shipments slightly increased.

The coke market is not very clearly defined. Prices lately going for prompt furnace coke have not been such as to attract operators, and it is possible they have been accumulating a little surplus against the fancy prices so generally predicted for holiday time. There is scarcely any demand for prompt coke so that the market is not thoroughly tested. Practically all the furnace coke contracting has now been done, and there are only occasional inquiries for all or any part of next year. As consumers have had to pay considerably higher prices on contracts for shipment after Jan. 1 than they are paying on current contracts, to expire Dec. 31, they have naturally been insisting on heavy shipments, and the end of the year may find them with fair supplies in yard or on track, a condition that would militate against any sharp advance on prompt coke.

Foundry coke continues in fair demand for prompt lots, and as high as \$3.25 is still obtained by a few operators who furnish particularly good coke and can make instant shipment, but there is other foundry coke of good grade available for considerably less. Not much activity has developed as to contracts for the first half of next year. Many consumers, perhaps the majority, have twelve-month contracts,

running to July 1. We quote: Prompt furnace, \$2.15@2.25; contract furnace, first half, \$2.35@2.50; year 1916, \$2.25@2.35; prompt and contract foundry, \$2.90@3.25, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Nov. 20 at 433,402 tons, an increase of 6,021 tons, and shipments at 435,337 tons, an increase of 4,834 tons.

Baltimore—The movement of coke has been erratic. Following a decided upward trend of two weeks since, when best Connellsville touched \$3.50, and West Virginia \$3, there was a reaction. Prices quoted to the trade here are about as follows: Low sulphur 72-hr. Connellsville, from \$2.75 to \$3; same, West Virginia, \$2.50; 48-hr. Connellsville, \$2.25 to \$2.50; same, West Virginia, \$2 to \$2.25.

Buffalo—The market is strong at former quotations, which are on the basis of \$4.85 to \$5 for 72-hr. Connellsville foundry. This market is not so active as it is in the producing districts, but is gaining. There is a scarcity of men, both at the ovens and in factories, which makes deliveries slow.

Chicago—The coke market is brisk with the supply short. Connellsville commands \$5.75, and byproduct foundry has shown an advance of 25c. per ton. Gas house coke is stronger. Prices per net ton, f.o.b. cars Chicago, are as follows: Byproduct, foundry, \$5.50@5.75; byproduct, domestic, \$4.95@5; Connellsville, \$5.50@5.75; Wise County, \$5.25@5.50; gas coke, \$4@4.25.

MIDDLE WESTERN

GENERAL REVIEW

Domestic demand fairly active. Steam coals booming. Screenings score further advances. Eastern grades still variable.

The situation in the Western coal markets is very encouraging. Railroads are storing more coal and trade is expanding everywhere with a broader distribution of shipments. Orders for all grades and sizes are now arriving in steady volume. Lower temperatures earlier in the week caused a spurt of orders by wire from many retailers with light stocks, who urged prompt shipment. Country absorption has been more extensive, and it is obvious that many retailers do not hold normal stocks for this time of year.

Shortages of cars and labor still persist. No consignment coal of any consequence is on hand at Western points. Industrial conditions have greatly improved, with steam demand advancing steadily. Screenings and slack maintain their strong position, and show tendencies toward further stiffening. Steam lump is asked for in larger quantities, and prices show greater firmness. Coarse sizes at Indiana and Illinois mines have been moved as fast as produced this week.

CHICAGO

Illinois and Indiana domestic sizes strong. Smokeless coals easy. Hocking grades holding strictly at circular.

Hand-to-mouth buying prevails to a large extent among the public, with constant re-ordering in small quantities, and the result is that many yards have found sales substantially less than previous years.

Franklin and Williamson County coals are moving in fair volume. Prices are rigidly maintained, and the mines are averaging four to five days per week. Screenings from southern Illinois mines are averaging around 70 to 75c. Saline County domestic sizes are moving at \$1.75.

Railroad orders to the mines in Central Illinois have been increased, and some of the coal shipped is undoubtedly going into storage. The domestic sizes are firm at \$1.75 and screenings are moving steadily at around 70 cents.

The recent cold snap brought an influx of orders for Indiana domestic coals by wire, confirming the opinion that storage supplies of retailers were below normal. An advance in price is scheduled for next week, perhaps 25c. per ton for domestic lump. Steam coals are strong, and such surplus tonnage as is not covered by contracts will undoubtedly yield higher prices in December.

Pocahontas lump has been soft but mine-run has held firm at \$1.40; egg is easy around \$1.65. It is felt that as the winter develops the situation in smokeless coals will grow stronger. No surplus splint coal has been available for sale in this market. Box car splint lump shipments are being sold readily at \$1.60 for direct forwarding from the mines. Pennsylvania smokeless lump, egg and mine-run are still in a strong position due to car shortages.

Hocking domestic lump is firm at from \$1.65 to \$1.75, and tonnage reaching this market about equals demand. The Hocking steam trade shows improvement, and fine coals are absorbed as fast as produced.

Car supply at Kentucky mines has improved. Some Eastern Kentucky domestic lump has been advanced to \$2.40, while second grades have sold as low as \$1.90. Mine-run is somewhat weaker.

Orders for anthracite from Northern Indiana have been increasing. In Western states like Iowa, Nebraska, Kansas and Missouri the stocking requirements for this year seem to be satisfied, although colder weather may cause some orders to appear. There is an increased rail movement of anthracite to Northwestern points. Chestnut is in good demand, and egg has been slow.

Quotations in the Chicago market per net ton, f.o.b. cars at mines are as follows:

	Williamson and Franklin Co.	Springfield	Sullivan	Clinton	Knox and Greene Cos.
Lump	\$1.65@1.75	\$1.60@1.75	\$1.50@1.65	\$1.50@1.65	\$1.50@1.65
Steam lump	1.25@1.35	1.20@1.30	1.15@1.30	1.25	
2½ and 3-in. lump	1.35@1.50	1.20@1.30	1.35		
1½-in. lump	1.25@1.35	1.20@1.35	1.25		
Egg	1.65@1.75	1.50@1.65	1.15@1.35	1.20@1.45	1.15@1.35
Nut	1.60@1.75	1.50@1.60	1.00@1.15	1.05@1.20	1.05@1.20
No. 1 washed	1.65@1.75	1.50	1.50	1.50	
No. 2 washed	1.40@1.50	1.40	1.40	1.40	
No. 1 nut	1.65@1.75	1.50	1.50	1.50	
No. 2 nut	1.50@1.60	1.50	1.50	1.50	
Mine-run	1.15	1.05@1.10	.85@.95	.90@1.10	.90@1.10
Screenings	.65@.75	.65@.75	.65@.75	.70@.80	.75@.80
Harrisburg & Saline Co., E. Kentucky	Pocah. & W. Va. Smok'l.	Penna.	Smokeless	Hocking	
Lump	\$1.60@1.75	\$1.60@2.25	\$1.65@2.00	\$2.25	\$1.65@1.75
1½-in. lump	1.30@1.40	1.15@1.30	1.50@1.75	1.50	
Egg	1.60@1.75	1.45@2.00	1.65@2.00	1.90@2.25	1.15@1.30
Nut	1.60	1.35@1.55	1.55	1.55	
No. 1 nut	1.65@1.75	1.50	1.50	1.50	
No. 2 nut	1.50@1.60	1.50	1.50	1.50	
Mine-run	1.10@1.15	1.15@1.25	1.40	1.40	1.15@1.25
Screenings	.70@.75	.65@.75	1.50	1.50	.75

Kanawha splint Lump, \$1.60.

INDIANAPOLIS

Large mines now well sold ahead. Prices not generally higher, but are quite firm. Storing against possible shutdown in the spring.

There is now no doubt of a well-established improvement in the Indiana coal trade. The largest operators report their mines sold up for thirty days and that they anticipate a busy winter. They are able to place more coal as the season advances. Railroads and factories are stocking, as well as buying freely to cover current needs. There is general industrial activity and steel plants, particularly, are going full time. Prices of screenings have advanced and nothing is being offered under 80c. f.o.b. mines, with No. 4 commanding 90c. Other grades have sympathetically stiffened, domestic lump selling at \$1.60 to \$1.65 f.o.b. mines. No. 4 mine-run is offered at \$1.15 to \$1.20, f.o.b. mines, and Nos. 5 and 6 at \$1.05.

ST. LOUIS

Mild weather causes a slowing up in domestic grades and the market has been maintained with difficulty.

Continued fine weather has caused a moderate slump in the lump grades during the past week. Demoralization in prices has been averted by the operators holding their output on track in the belief that cold weather cannot be far off. Stagnation in lump has sent the finer grades up some.

Quotations f.o.b. mines during the past week have ranged on the following basis per short ton:

	Frnk. Co.	Wlmon. Co.	Staunton	Standard
6-in. lump	\$1.50@1.65	\$1.50@1.65	\$1.25	\$0.90@1.10
8-in. lump	1.50	1.50	1.15	1.15
2-in. lump	1.40@1.65	1.40@1.65	1.15	1.00@1.10
3x6 egg	1.40@1.65	1.40@1.65	1.00@1.15	1.00@1.15
2x6 egg	1.40@1.65	1.40@1.65	1.00@1.15	1.00@.85
No. 1 nut	1.50@1.75	1.50@1.75	1.50	.80
No. 2 nut	1.25@1.50	1.25@1.50	1.25	.70
No. 1 washed	1.40@1.50	1.40@1.50	1.40@1.50	1.40@1.50
No. 2 washed	1.25@1.40	1.25@1.40	1.25@1.40	1.25@1.40
No. 3 washed	1.15@1.25	1.15@1.25	1.15@1.25	1.15@1.25
No. 4 washed	1.15@1.25	1.15@1.25	1.15@1.25	1.15@1.25
No. 5 washed	.75@.85	.75@.85	.75@.85	.75@.85
Screenings	.65@.70	.65@.70	.50	.40@.50

Freight Rates—Inner group, St. Louis, 57½c. East St. Louis 37½c. Outer group, St. Louis, 72½c. East St. Louis, 52½c.

DULUTH

Season of navigation soon to close. Receipts are heavy. Shipments are brisk.

Coal receipts during the past week have been quite heavy. Dock companies are rushing coal cargoes forward in anticipation of the close of navigation, which is likely to occur at any time. Heavy storms on the eastern end of Lake Superior delayed the arrival of many vessels last week, and hence there is considerable bunching of cargoes this week, no less than 19 vessels having arrived in one day.

Shipments have been well maintained, freezing weather

and the appearance of snow having induced many retailers and the householders to stock up. The demand from the railways and steam users has been quite brisk and conditions generally for the past week have been very satisfactory. Prices per short ton f.o.b. docks are as follows:

	Yough	Splint	Hock	Smokeless	Elkhorn
Lump	\$3.40	\$3.40	\$3.40	\$4.75	\$3.75
Dock run	3.10	3.10	3.10	3.25	3.25
Stove or nut	3.40	3.40	3.40	4.75	3.65
Screenings	2.40	2.40	2.25	2.75	2.40

Conditions have been quite favorable during the past week and there has been a heavy movement of anthracite coal. The weather has been cold and the first appearance of winter shook out a large number of orders for immediate shipment. Prices per short ton f.o.b. docks are as follows: Nut, \$7.10; egg and stove, \$6.85; pea, \$5.55 and buckwheat, \$4.

PRODUCTION AND TRANSPORTATION STATISTICS

BALTIMORE & OHIO

The following is a statement of coal and coke tonnage moved over this system and affiliated lines during October and the previous two months:

	August		September		October	
	1915	1914	1915	1914	1915	1914
Coal	3,009,028	2,769,453	3,034,271	2,878,963	3,124,328	2,662,377
Coke	345,258	242,283	331,224	237,661	368,257	208,866
Total	3,354,286	3,011,736	3,365,495	3,116,624	3,492,585	2,871,243

IMPORTS AND EXPORTS

The following is a comparative statement of coal and coke imports and exports of the United States for August, 1914-15, and for the eight months ending August, 1913-14-15, in long tons:

	August		Eight Months Ending		August
	1914	1915	1913	1914	
Anthracite (total)	77		30	15,902	2,390
Bituminous (total)	103,469	116,295	919,418	861,513	951,517
Imported from—					
United Kingdom	50	200	3,693	8,308	15,610
Canada	80,608	84,770	746,029	669,512	758,634
Japan	13,466	10,540	70,229	44,449	56,919
Australia	9,173	20,785	96,651	137,191	117,778
Other countries	172		2,816	2,053	2,576
Coke (total)	5,288	9,231	46,802	67,003	33,620
Anthracite (total)	455,305	307,147	2,847,443	2,666,969	2,304,964
Exported to—					
Canada	452,538	293,318	2,800,112	2,627,945	2,261,722
Argentina	1,740				2,335
Brazil	2,372				2,415
Uruguay	600				605
Other countries	2,767	9,117	47,331	39,024	37,887
Bituminous (total)	1,955,176	2,000,848	11,834,511	9,045,260	10,588,583
Exported to—					
Italy	382,154				2,023,945
Canada	1,513,096	947,069	8,652,472	6,038,926	4,737,655
Panama	22,067	49,423	351,850	190,965	329,450
Mexico	24,705	18,507	377,098	215,068	216,246
Cuba	79,537	114,299	868,114	696,111	734,536
Other West Indies	60,550	42,347	419,496	415,824	308,605
Argentina	25,811	128,823	48,626	138,219	662,714
Brazil	54,695	53,002	200,088	155,225	482,971
Uruguay	10,920	30,956	5,163	56,514	130,790
Other countries	163,795	234,268	911,604	1,138,408	961,671
Total coal	2,410,481	2,307,995	14,681,954	11,712,229	12,893,547
Coke	48,220	83,085	607,767	456,661	513,679
Bunker coal	512,700	672,990	5,079,189	5,038,576	5,027,027

FOREIGN MARKETS

GREAT BRITAIN

Nov. 19—There is no change in the general situation. Business is still restricted by lack of tonnage and stocks continue excessive. Quotations are approximately as follows:

Best Welsh steam	Nominal	Best Monmouthshires...	\$4.32
Best seconds	Nominal	Seconds...	4.20
Seconds	\$4.32	Best Cardiff smalls...	2.64
Best dry coals	5.64	Cargo smalls...	1.68

The prices for Cardiff coals are f.o.b. Cardiff, Penarth, or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freights—Rates have further advanced for the Mediterranean and the tendency is still upward. Rates are approximately as follows:

Gibraltar	\$7.08	Naples	\$11.88	St. Vincent	\$7.80
Marseilles	10.83	Alexandria	12.24	River Plate	9.00
Algiers	9.65	Port Said	12.24		
Genoa	11.88	Las Palmas	7.20		

Coal Contracts Pending

The purpose of this department is to diffuse accurate information of prospective purchases and prices with a view to affording equal opportunity to all, promoting market stability and inculcating sound business principles in the coal trade.

+Indicates contracts regarding which official information has been received.

Supplemental Notes

Under this heading additional or supplemental information regarding old contracts appears, together with the page number of the original notice.

1401—New Orleans, La.—Purchases on this contract (p. 447), which provide for furnishing the Robert Werk Pressing Cloth Co. with its annual requirements of coal, involving approximately 300 tons of lump or mine-run, will be confined to the open market because of the unsettled conditions in the coal trade. Address Pres. Robert Werk, Robert Werk Pressing Cloth Co., 2519 St. Phillip St., New Orleans, La.

1451—New Orleans, La.—This contract (p. 530), which provides for furnishing the fuel requirements for the Algiers Distilling Co., will not be negotiated until about the middle of January. Address Purchasing Agent, The Algiers Distilling Co., Brooklyn Ave. and Mississippi Levee, Algiers, La.

+1598—New Orleans, La.—Bids will be received on this contract (p. 736), until 11 a.m., Dec. 7. The contract provides for furnishing the Public Belt Co. with its annual requirements of coal, involving approximately 8,000 tons of either mine-run, washed nut, slack or washed slack. The bids should be made on the basis of short tons, f.o.b. New Orleans at some point on the Public Belt tracks. All bidders will be required to furnish the Purchasing Committee carload samples to be paid for by the Commission for the purpose of testing. Address Secy. Frank H. Joubert, 6th floor, Municipal Bldg., New Orleans, La.

1635—Denver, Colo.—This contract (p. 870), which provides for furnishing the Post Office at this place with approximately 600 tons of good grade of bituminous lump coal over a 2 in. screen, was bid on as follows, per long ton: Colorado & Utah Coal Co., \$4.50; Moffat Coal Co., \$4.76; the Great Northern Fuel Co., \$4.84; William E. Russell, \$4.84; The Colorado Fuel and Iron Co., \$4.92; The National Fuel Co., \$4.98; The Rocky Mountain Fuel Co., \$5.07. Address Custodian B. F. Stapleton, U. S. P. O., Denver, Colo.

1648—Jersey City, N. J.—No bids were received on this contract (p. 871), which provides for furnishing the county institutions with coal. Address Clk. Walter O'Mara, Bd. of Chosen Freeholders, Hudson County, Jersey City, N. J.

New Business

Volume and page number in parenthesis at the end of an item indicate where the previous announcement, bids and awards on that contract may be found.

1685—Cincinnati, Ohio—The Union Central Life Insurance Co. of this place require about 5,000 tons of nut and slack coal, and 200 tons of smokeless coal per annum. Deliveries are made by wagon at the rate of 13 to 15 tons per day. They have a storage capacity of 400 tons, and the next contract will be made Jan. 1. Address Pur. Agt. W. W. McIntyre, Union Central Life Ins. Co., 4 Pine St., Cincinnati, Ohio.

1686—Alton, Ill.—The Alton Steel Hoop Co. at this place has requested bids to cover their fuel requirements during the year beginning Jan. 1. From 250 to 300 tons per week of 1½-in. screenings will be required, and 150 to 250 tons of 3x2-in. or 4x2-in. gas producer coal. The consumption will be dependent on whether the mill is operated single or double turn. Address Secy. M. L. Mozier, The Alton Steel Hoop Co., Alton, Ill.

+1687—Millvale, Penn.—The local electric light plant at this place usually contracts for their annual fuel requirements involving approximately 30,600 tons of 1¼-in. lump about Jan. 1. The business is let on competitive bids and the approximate price is \$2.25 per ton. Address City Clk., Millvale, Penn.

1688—San Antonio, Tex.—The St. Anthony Hotel at this place usually contracts for its annual fuel requirements involving about 40 tons of lignite per month on the first of the year. Address Chf. Engr. Orr, St. Anthony Hotel, San Antonio, Tex.

1689—St. Louis, Mo.—The Standard Stamping Co. at this place is receiving bids for their annual fuel requirements involving four or five cars of lump or egg coal per month. Address Pur. Agt. Porter Wiegand, Standard Stamping Co., St. Louis, Mo.

1690—Bangor, Penn.—The S. Flory Manufacturing Co. usually contracts for their annual fuel supply semi-annually, in January and July. They require about 1,900 tons of bituminous coal and deliveries are made by railroad at the rate of four cars per month. In addition to this they require about three cars of smithing coal per annum, though this is not bought on a contract. The company has storage capacity for 100 tons. Address Pur. Agt. E. G. Markley, The S. Flory Manufacturing Co., Market St., Bangor, Penn.

1691—St. Louis, Mo.—The American Paper Products Co. is in the market for their annual requirements of coal involving approximately 200 tons of Carterville 1½-in. screenings per month. Bids are also being received for furnishing the Carthage, Indiana plant of the company with approximately 1,000 tons per month. Address Pur. Agt. Pollock, American Paper Products Co., St. Louis, Mo.

1692—Battle Creek, Mich.—The Advance Pump and Compressor Co. at this place usually contracts for their annual fuel requirements, involving approximately 400 tons of West Virginia egg coal on Jan. 1. Deliveries are made by railroad at the rate of one car per month, and the company has a storage capacity of 150 tons. Address Purchasing Agent, Advance Pump and Compressor Co., Battle Creek, Mich.

1693—Philadelphia, Penn.—The Industrial Cold Storage and Warehouse Co. at this place contracts for their annual fuel requirements involving approximately 6,000 tons of gas slack on Jan. 1. Deliveries are made by railroad at the rate of 120 tons per week. The company has storage capacity for 360 tons. Address General Manager, Industrial Storage and Warehouse Co., American and Berks St., Philadelphia, Penn.

1694—Philadelphia, Penn.—The Thomas Devlin Manufacturing Co. at this place usually contract for their annual fuel requirements about Jan. 1. The tonnages involved are: Anthracite broken, 3,300; Lykens Valley pea, 1,000; bituminous gas, 4,000; steam, 1,500; 72-hr. coke, 900. Deliveries are made by railroad as required. Address Pur. Agt. H. Drinkerhouse, Thomas Devlin Manufacturing Co., 3rd and Lexington Ave., Philadelphia, Penn.

+1695—Peoria, Ill.—The Elsberry, Missouri, Drainage District is in the market for approximately 1,200 tons of 1½-in. screened lump. About 500 tons will be required soon, and the balance later. Bids will be received until 10 a.m., Dec. 6, and the coal will be bought on a heat unit basis. Address Harman Engineering Co., 144 Fredonia Ave., Peoria, Ill.

+1696—Elmira, N. Y.—The Water Board will receive bids until 5 p.m., Dec. 14, for furnishing approximately 2,000 tons of bituminous mine-run coal during the year 1916. Smokeless coal is required, and it must not contain more than 25.99% volatile matter. The board contemplates its purchase on a heat unit basis, and an analysis of the coal must accompany each bid, which analysis will be used as the basis for computing the heat value. Address Gen. Mgr. H. M. Beardsley, Water Board, Elmira, N. Y.

1697—St. Louis, Mo.—The Independent Breweries is in the market for coal required at its different plants as follows: American Brewery, 300 to 600 tons of 1¼-in. screening per month; National Brewery, 300 to 600 tons of either Nos. 2, 3, 4 or 5, or mixtures of washed sizes; Columbia Brewery, 500 tons per month of 1½-in. screenings; Empire Brewery, 500 to 600 tons per month of 1½-in. screenings, or Nos. 2, 3, 4, 5 washed or mixed washed sizes; Central Brewery, 500 to 600 tons per month of 2-in. lump, and either Nos. 3, 4, 5 washed or mixed washed sizes; Gast Brewery, 400 tons per month of 2-in. lump, and either Nos. 3, 4 or 5 washed or mixed sizes; Wagner Brewery, 350 tons per month of 1½-in. screenings, and either Nos. 2, 3, 4 or 5 washed or mixed washed sizes.

National, Central, Empire and Wagner Breweries require carload deliveries, and the balance wagon deliveries. Address Pur. Agt., Carl Krausnick, The Independent Breweries, St. Louis, Mo.

1698—Milwaukee, Wis.—When the new city budget goes into effect Jan. 1 the Department of Public Works will advertise for new contracts for furnishing the Menomonee Special Sewerage Pumping Station with approximately 2,000 tons of Pocahontas and mine-run coal. The last previous contract was held by the Milwaukee Western Fuel Co. and at the present time the coal is bought in the open market. Address Chief Clk. Wm. H. Schacht, Jr., Dept. of Public Works, Milwaukee, Wis. (Vol. 7, p. 189.)

+1699—Columbus Grove, Ohio—The Board of Public Works at this place is testing out West Virginia mine-run coal with a view to entering into a contract shortly. They require about one car per week and delivery is made by C. H. & D. R.R. Address Clerk, Board of Public Works, Columbus, Ohio.

1700—Denver, Colo.—The Colorado Packing and Provision Co. at this place consume about 40 tons of coal per day, for which they contract some time in January. Address Purchasing Agent, Colorado Packing and Provision Co., Denver, Colo.

1701—Camden, N. J.—The New York Shipbuilding Co. is in the market for approximately 1,200 tons white ash broken coal, deliveries to be made during 1916. Address Pur. Agt. Leon G. Buckwalter, New York Shipbuilding Co., Camden, N. J.

+1702—Bluffton, Ohio—The Board of Public Affairs at this place is testing out various grades of West Virginia and Ohio coal, preparatory to placing a contract covering their requirements. Address Purchasing Agent, Board of Public Affairs, Bluffton, Ohio.

1703—Miles City, Mont.—Bids were received until Dec. 1 for furnishing coal required at the Carnegie Library during the ensuing year. Deliveries are to be made as required and bidders should specify the grade of coal they propose furnishing and the price. Address Sec. Ida W. Fearnall, Bd. of Trustees, Miles City, Mont.

1704—Norristown, Penn.—Counties Gas and Electric Co. will be in the market about Jan. 1 for their annual supply of broken coal, estimated at from 5,000 to 6,000 tons. Address Pur. Agt. J. A. Pearson, Broad and Arch St., Philadelphia, Penn.

1705—Colorado Springs, Colo.—The Dourte-Hessell Manufacturing Co. at this place will contract about Jan. 1 for their annual fuel requirements, involving approximately 500 tons of slack coal, deliveries to be made at the rate of about 40 tons per month. Address Pur. Agt. W. W. Hassell, Dourte-Hessell Manufacturing Co., Colorado Springs, Colo.

1706—Columbus, Ohio—The John Wildi Evaporated Milk Co. at this place is in the market for approximately 2,500 tons of smokeless or semi-smokeless mine-run coal, for their Bainbridge, N. Y., plant, 2,000 tons for use at Lewisburg, Penn., and 2,300 tons for use at their Troy, Penn., plant. Complete details and specifications may be had on application. Address General Superintendent, John Wildi Evaporated Milk Co., Columbus, Ohio.

1707—Jefferson, Wis.—The Board of Education at this place will receive bids until Dec. 6 for furnishing approximately 150 tons of West Virginia splint, dock screened coal, to be delivered as required at the High School and Public Library. Address Chn. S. E. Waterbury, Bd. of Edu., Jefferson, Wis.

1708—Clearfield, Penn.—The City Council received bids until 7 p.m., Dec. 1, for furnishing coal as may be required for the hose houses in the Second, Third and Fourth wards. Address Sec. J. D. Connelly, City Council, Clearfield, Penn.

1709—Denver, Colo.—The Three Forks Portland Cement Co. are in the market for one carload of Pennsylvania blacksmith coal. Quotations should be made f.o.b. Trident, Mont. Address Sec. and Gen. Mgr. R. J. Morse, 508 Ideal Bldg., Denver, Colo.

1710—Cleveland, Ohio—T. P. Jones, fuel agent at this place, is in the market for 200 cars of West Virginia slack, or nut and slack coal, deliveries to be made at the rate of two cars per day beginning immediately. Address T. P. Jones, Fuel Agt., Cleveland, Ohio.

1711—Cumberland, Md.—The Allegheny County Commissioners will receive bids until noon, Dec. 7, for furnishing and delivering coal as may be required during the ensuing year in the bins of the court house and jail, and in carload lots on Payne Spring siding for the Insane Asylum and County Home. Bidders must specify what mine they propose furnishing the coal from. Address Clk. Angus Ireland, Allegheny County, Cumberland, Md.

Contracts Awarded

Note—Successful bidders are noted in **bold face** type.

+1439—Muscatine, Iowa—This contract (p. 490), which provides for furnishing and Muscatine-Louisa Drainage District, No. 13, with approximately 200 tons of soft lump coal, has been awarded to **W. G. Block & Co.** Four bids were submitted. Address Audr. H. C. Shoemaker, Muscatine, Iowa.

+1442—Crookston, Minn.—This contract (p. 490), which provides for furnishing the Polk County Court House with 160 tons of Hocking Valley mine-run coal, was awarded to **S. W. Vance & Co.**, of Crookston, at \$6 per ton. Deliveries to be made as required and to be concluded before next spring. Address Audr. H. J. Welte, Polk County, Crookston, Minn.

1446—Mauch Chunk, Penn.—This contract (p. 490), which provides for furnishing the Borough School Board with coal has been awarded as follows: **H. A. Butler & Co.**, 60 tons of chestnut for the Asa Packer Building at \$5.40 per ton; **Lehigh Coal and Navigation Co.**, 75 tons of peat for the First Ward Building, at \$3.60 per ton. Address Secy. C. S. Weiler, School Bd., Mauch Chunk, Penn.

+1461—Albia, Iowa—This contract (p. 530), which provides for furnishing the several buildings of the Independent School District with coal, has been awarded to **Hammond & Moss** at \$2.30 per ton for clean lump coal. A small quantity of steam coal will also be required which is now being bought in the open market at \$1.50 per ton. There were four additional bids submitted on the contract for the lump coal ranging from \$2.30 to \$3 per ton. Address Secy. C. W. Smallwood, Independent School Dist., Albia, Iowa.

+1463—Little Falls, Minn.—This contract (pp. 530, 870), which provides for furnishing the City Government with approximately 50 tons of Youghiogheny coal, was divided equally between **W. H. Ryan** and **Julius Zetka**. Address Comr. H. J. Lafond, Little Falls, Minn.

+1469—Warren, Minn.—This contract (p. 531), which provides for furnishing the Marshall County Court House with approximately 125 tons of Youghiogheny screened lump coal, has been awarded to **Knutson & Holson**, at \$5.62 per ton, delivered. Address Audr. A. G. Lundgren, Warren, Minn.

+1478—Jamesburg, N. J.—This contract (p. 531), which provides for furnishing the New Jersey State Home for Boys with approximately 3,500 tons of buckwheat and 100 tons of stove coal, has been awarded to **Miles Ross & Sons**. Address Supt. Richard J. Drever, New Jersey State Home for Boys, Jamesburg, N. J.

+1490—Leetonia, Ohio—This contract (p. 576), which provides for furnishing the local water works with coal required during the ensuing year has been rewarded to **F. J. Neheisel** at \$2 for lump, \$1.80 for mine-run and \$1.10 for slack. This contractor has had this business for several years. Only one other bid was received on the business. Address Secy. Jacob Kuegle, Bd. of Pub. Affairs, Leetonia, Ohio.

1507—New Orleans, La.—This contract (p. 577), which provides for furnishing the fuel requirements for the Dixie Laundry Co., has been awarded to the **C. A. Andrews Coal Co.** Address Sec.-Treas. Max N. Kohler, Dixie Laundry Co., 1124 Tulane Ave., New Orleans, La.

1551—East St. Louis, Ill.—This contract (pp. 660, 828), which provides for furnishing Swift & Co. with approximately 120 tons of 1½-in. or 2-in. screenings per day, was awarded to the **Breese Trenton Mining Co.** It is understood the contract will run until Mar. 31, 1917, and that the price was 50c. per ton f.o.b. cars at the mines. Address H. C. Huggins, Swift & Co., East St. Louis, Ill.

1574—New Orleans, La.—This contract (p. 699), which provides for furnishing the International Distillery Co. with approximately 350 tons of coal, deliveries to be made during the next year, has been awarded to the **C. A. Andrews Coal Co.** Address Pur. Agt. Kern, International Distillery Co., Pine and Ferdinand St., New Orleans, La.

1576—New Orleans, La.—This contract (p. 700), which provides for furnishing the Lane Cotton Mills with approximately 50 cars of steam coal, has been closed with a New Orleans concern until next May. Address Pur. Agt. R. Lecorgne, Lane Cotton Mills, 434 Cadiz St., New Orleans, La.

1579—New Orleans, La.—The award on this contract (pp. 700, 829), which provides for furnishing the Cosmopolitan Hotel with approximately 120 tons of coal per month, was made to the **Darsam Bros. Coal Co.** Address Pur. Agt. Major Stewart, Cosmopolitan Hotel, 120 Bourbon St., New Orleans, La.

1580—St. Louis, Mo.—This contract (p. 736), which provides for furnishing the Liggett & Myers Tobacco Co. with its annual requirements of coal, involving approximately 2,000

tons of either 1½-in. screenings or No. 5 washed slack per month, has been awarded to the **Consolidated Coal Co.** The contract is to run for one year from date. Address Gen. Mgr. R. D. Lewis, Liggett & Myers Tobacco Co., St. Louis, Mo.

+1600—Warrensburg, N. Y.—This contract (p. 736), which provides for furnishing the fuel requirements for School District No. 1, during the ensuing school year, has been awarded to **A. C. Emerson & Co.**, who were the lowest bidders. Address Secy., Board of Education, Union Free School District, No. 1, Warrensburg, N. Y.

+1612—Aliquippa, Penn.—This contract (p. 786), which provides for furnishing the Village Government with approximately 500 bu. of 1¼-in. bituminous lump coal, has been awarded to **J. A. Barto** at 9¾c. per bu. Address Secy. L. S. Patton, Municipal Bldg., Aliquippa, Penn.

+1616—Houston, Tex.—This contract (p. 786), which provides for furnishing the winter supply of coal to the Harris County institutions known as the Boys' School at South Houston and the Harris County School for Girls at Bellaire, was awarded by the Harris County Board of Commissioners on Nov. 10 to **Ed Sacks**, of Houston, on the following basis: McAlester nut coal, f.o.b. South Houston, \$5.20; f.o.b. Bellaire, \$6.85. Other bids submitted were: Richard Cocke & Co., f.o.b. South Houston, \$9; Bellaire, \$11.50; Sampson & Beardon, South Houston, \$5.75; Bellaire, \$8.50; Houston Wood and Coal Co., South Houston, \$5.25; Bellaire, \$8; Rice & Coles, South Houston, \$5.30; Bellaire, \$6.60; Crystal Ice and Coal Co., South Houston, \$10.25; Bellaire, \$10.25; Richey Wood Co., South Houston, \$10.50; Bellaire, \$12. Address County Audr. H. L. Washburn, Houston, Tex.

1618—St. Louis, Mo.—This contract (p. 786), which provides for furnishing the St. Louis Dressed Beef and Provision Co. plant with approximately 100 tons per day of 1½-in. screenings, has been awarded to the **Bickett Coal and Coke Co.** The contract is to run for one year. Address Pur. Agt. J. M. Weiser, 3919 Papin St., St. Louis, Mo.

1625—Marshall, Minn.—This contract (p. 828), which provides for furnishing the local city power plant with approximately 1,800 tons of coal, has been awarded to the **Marshall Milling Co.** at 75c. per ton for Franklin County 2-in. screenings f.o.b. Marshall. Address Rec. T. L. Bumford, Marshall, Minn.

1627—Belfield, N. D.—This contract (p. 828), which provides for furnishing the local Court House with coal as may be required during the ensuing year, has been awarded to **A. A. Dinsdale** at \$2.90 per ton for lignite coal. Address County Audr. J. L. Hughes, Belfield, N. D.

1632—Greenville, Ohio—This contract (p. 828), which provides for furnishing the Darke County Board of Commissioners with approximately 100 tons of Pocahontas lump coal for delivery on cars, P. C. C. & St. L. sidetracks at Greenville, has been awarded to **M. A. Maher** at \$3.50 per ton for 2-in. screenings. Address Clk. G. H. Garrison, Darke County Board of Comrs., Greenville, Ohio.

+1633—New York, N. Y.—This contract (pp. 828, 911), which provides for furnishing the Central Purchasing Committee with approximately 10,000 tons of anthracite and bituminous coal for various city departments, has been awarded as follows, per gross ton: Zone 1, **Bacon Coal Co.**, \$3.38; Zone 7, **C. H. Reynolds & Sons**, \$3.25; Zone 9, **Bacon Coal Co.**, \$5.40; Zone 11, **Jamieson & Bond Co.**, \$7.85; Zone 17 Class "B," **John E. Donovan**, \$7.10; Zone 18, Class "B," 300 and 1,000 tons, **William Farrell & Son**, \$3.99 and \$2.12 respectively; Zones 1 to 17 inclusive, tonnages of 100, 75, 150, and 50, **F. M. A. Lench**, \$6.85, \$6.85, \$7.20 and \$8.10 respectively and same zones tonnage of 25 tons to **S. Haber** at \$6.95. Bid on Zone 8 was rejected while bids on Zones 3 and 17, Class "A," and Zone 18, Class "A," are still under consideration, tests being made of the coal offered. Address, Central Pur. Com., Room 1126, Municipal Bldg., New York City. (No. 706, Vol. 7, p. 915).

+1637—Philadelphia, Penn.—This contract (p. 870), which provides for furnishing the Philadelphia County prison with approximately 2,000 tons of buckwheat, has been awarded to **William Bryant** on Lykens Valley buckwheat, at \$3.30 per gross ton, delivered at Holmesburg Prison and \$4.23 at the Reed St. Prison. This company was also awarded contract for 100 tons of white ash stove at \$5.78 for delivery at Holmesburg and \$6.88 at Reed St. Address Supt. Frederick A. Cooke, 16th and Reed St., Philadelphia, Penn.

+1642 Bayonne, N. J.—This contract (p. 870), which provides for furnishing approximately 200 tons of anthracite egg and stove coal to the various fire houses and police headquarters, has been awarded to **Wm. Laubenheimer**, at \$5.49 per ton. Address, City Clk. Wm. P. Lee, Bd. of Comrs., Bayonne, N. J.

1644—Maryland, N. Y.—This contract (p. 870), which provides for furnishing the Union Free School District No. 2 with

one carload of stove coal, has been awarded to **Platt & Howland** at \$6 per ton. J. B. Murdock bid \$6.25. Address Clk. R. B. Safford, Union Free School Dist. No. 2, Maryland, N. Y.

+1646—Media, Penn.—This contract (p. 870), which provides for furnishing the City Government with approximately 200 tons of Lykens Valley pea coal, has been awarded to the **Philadelphia & Reading Coal and Iron Co.** at \$2.50 per gross ton at the mines. Address Clk. Ed. Minton, Media, Penn.

1684—Salt Lake City, Utah—This contract (p. 912), which provides for furnishing the Board of Education with approximately 5,000 tons of slack and 500 tons of lump and nut coal, has been awarded to the **Bamberger Coal Co.** at \$2.45 for slack and to the **Parrott Coal Co.** at \$4.65 for nut and \$5.20 for lump coal. The prices include delivery at the schools. Most of the bids submitted on this business were at the regular circular prices of \$5.25 for nut and \$5.75 for lump, though a few other bids were received at somewhat less, which is distinctly contrary to the experience in former years. The slack coal will be furnished from Wyoming mines and the lump and nut from the Utah mines. There were 13 bidders altogether on the contract. Address Clk. L. P. Judd, Bd. of Edu., Room 202 City and County Bldg., Salt Lake City, Utah.

Contract Notes

Somersworth, N. H.—The Great Falls Woolen Co. consumes about 600 tons of bituminous coal per annum.

St. Louis, Mo.—The Terminal Railroad, one of the largest coal consumers here is confining its purchases to the open market.

Cincinnati, Ohio—The E. L. Sternberger Coal Co. have contracted for the entire output of the **Eastern Kentucky Coal Co.**, whose operations are at Torch Light, Ky.

Auburn, Me.—The contract for furnishing the local Post Office building with 40 tons of New River mine-run coal has been awarded to **Pulsifer & Young** at \$212. Address Postmaster Alfred T. Hicks, Auburn, Me.

Atlanta, Ga.—The Atlanta Hosiery Mills consumes approximately 400 tons of nut and slack coal per annum, deliveries being at the rate of 30 tons per month. Address Pur. Agt. Atlanta Hosiery Mills, Atlanta, Ga.

Cavendish, Vt.—Gay Bros. Co. consume about 800 tons of lump coal per annum. Deliveries are made by railroad and they have a storage capacity for 700 tons. Address Pur. Agt. J. E. Gay, Gay Bros. Co., Cavendish, Vt.

Bridgeton, R. I.—W. H. Prendergast, manufacturer at this place, consumes about 700 tons of bituminous coal per annum. Deliveries are made by railroad in carload lots. The company has a storage capacity for 100 tons.

Ardmore, S. D.—The contract for furnishing the County Government with coal during the ensuing year has been awarded to **Mosher & Klime** at \$5.25 per ton for egg coal. Address County Audr. D. K. Batchelor, Ardmore, S. D.

St. Louis, Mo.—The contract for furnishing the National Lead Co. with the coal supply for its plant at Howards Station during the period ending Mar. 31, 1916, has been awarded to the **Big Muddy Coal and Iron Co.**, on Big Muddy screenings.

Philadelphia, Penn.—The contract of the Pecora Paint Co. (p. 829), involves from 600 to 1,000 tons of anthracite coal instead of 600 tons as previously noted. Address Pur. Agt. F. B. Bowen, Pecora Paint Co., 4th and Venango St., Philadelphia, Penn.

St. Louis, Mo.—The contract for furnishing the Wrought Iron Range Co. with approximately 150 tons of 2-in. screened lump coal has been awarded to the **Donk Bros. Coal and Coke Co.** Address Pur. Agt. Kalbfleisch, Wrought Iron Range Co., St. Louis, Mo.

Fall River, Mass.—The Osborn Mills at this place consume approximately 4,800 tons of bituminous and 700 tons of anthracite coal per annum. Deliveries are made by wagon from the dock. Address Pur. Agt. James T. Miller, Osborn Mills, Fall River, Mass.

Granite City, Ill.—The National Stamping and Enameling Co. will, on Friday of each week, purchase their requirements for the ensuing week; 1½-in. screenings are used. Address Pur. Agt. R. C. Lutten, National Stamping and Enameling Co., Granite City, Ill.

Philadelphia, Penn.—The Philadelphia Grain Elevator Co. purchase about 120 tons of anthracite pea coal per annum. Delivery is made by Philadelphia & Reading R.R. Address Purchasing Agent, Philadelphia Grain Elevator Co., 20th and Hamilton St., Philadelphia, Penn.

St. Louis, Mo.—The contract for supply the Banner Buggy Co. and the Chevrolet Manufacturing Plant now under con-

struction, has been awarded to the **Lumaghi Coal Co.** on 2-in. shaker screened coal. Address Pur. Agt. R. M. Taylor, Banner Buggy Co., St. Louis, Mo.

St. Louis, Mo.—The contract for furnishing the Buck Stove and Range Co. with approximately 200 tons of 1½-in. screenings per month has been awarded to the **Lumaghi Coal Co.** on their "Black Brier" coal. Address Chief Engr. Dix, Buck Stove and Range Co., St. Louis, Mo.

Shelbyville, Ill.—The contract for furnishing the City Water Works with approximately 130 tons per month of 1½-in. screenings, has been awarded to the **Lumaghi Coal Co.** on their "Black Brier" coal. Address Mgr. and Pur. Agt. C. E. Chester, City Water Works, Shelbyville, Ill.

St. Charles, Mo.—The contract for furnishing the St. Charles Milling Co., with approximately 60 tons of 2-in. screened coal per month, was awarded to the **Lumaghi Coal Co.** on their "Cantine" coal. Address Pres. and Pur. Agt. J. H. Werner, St. Charles Milling Co., St. Charles, Mo.

Cincinnati, Ohio—It is reported that the contract of the Philip Carey Manufacturing Co., involving approximately 12,000 tons of nut and slack coal for their Lockland plant has been awarded to the **Middle West Coal Co.** Address Pur. Agt. Philip Carey Manufacturing Co., Cincinnati, Ohio.

Hermann, Mo.—The contract for furnishing the Hermann Ferry and Packet Co. with approximately 60 tons of 6-in. lump coal per month has been awarded to the **Lumaghi Coal Co.** on its "Black Brier" coal. Address Secy. and Pur. Agt. Fred. Lang, Hermann Ferry and Packet Co., Hermann, Mo.

Philadelphia, Penn.—E. E. Brown & Co., Inc. consume about 400 tons of buckwheat coal per annum. The company does not contract. Deliveries are made by railroad at the rate of about one car per month. Address Pur. Agt. E. E. Brown & Co., Inc., McKearney and Meadow St., Philadelphia, Penn.

Hallock, Minn.—The contract for furnishing the County Board with coal during the ensuing year has been awarded to the **St. Anthony & Dakota** and **St. Hilaire** companies, at \$10.25 for anthracite and \$7.25 for bituminous, including delivery. Address County Audr. James Davnie, Hallock, Minn.

St. Louis, Mo.—The contract for furnishing the Johnston Tinfoil and Metal Co. with their fuel requirements involving approximately 155 tons per month has been awarded to the **St. Agnes Coal Co.** on Carbon lump. Address Treas. and Pur. Agt. F. H. Penney, Johnston Tinfoil and Metal Co., St. Louis, Mo.

New Britain, Conn.—Beaton & Cadwell Mfg. Co., at this place, consume approximately 200 tons of steam coal per annum. They have storage capacity for 40 tons, and deliveries are made by railroad at the rate of one car every six weeks. Address Purchasing Agent, W. H. Cadwell, New Britain, Conn.

Woonsocket, R. I.—The Guerin Spinning Co. at this place consumes approximately 1,500 tons of coal per annum. They have a storage capacity for 500 to 600 tons, and deliveries are made by wagon at the rate of two to three cars at a time. Address Pur. Agt. Ballon, Guerin Spinning Co. Social St., Woonsocket, R. I.

St. Louis, Mo.—The contract for furnishing the William's Patent Crusher and Pulverizer Co. with about 90 tons of 6x3-in. egg coal per month has been awarded to the **Big Muddy Coal and Iron Co.** on their Herrin No. 6 coal. Address Pur. Agt., W. J. Hanson, William's Patent Crusher and Pulverizer Co., St. Louis, Mo.

Buffalo, N. Y.—The Ericsson Mfg. Co., consumes about 1,200 tons of three-quarter Youghiogheny coal per annum. Deliveries are made by railroad and at the rate of one car per week during the winter months. They have a storage capacity of 250 tons. Address Pur. Agt. H. R. Dilks, Ericsson Mfg. Co., Buffalo, N. Y.

Columbus, Ga.—George O. Berry, at this place, purchases approximately 5,000 tons of washed nut and mine-run coal per annum, deliveries being made by railroad at the rate of 400 to 500 tons per month. The company has storage capacity for 300 tons. Address Pur. Agt. F. E. Berry, care of George O. Berry, Box 5, Columbus, Ga.

Fall River, Mass.—The Richard Borden Manufacturing Co., at this place consume approximately 8,500 tons of Pocahontas coal delivered by water to the city, and by wagon to the point of consumption at the rate of approximately 28 tons per day. Address Purchasing Agent, Richard Borden Manufacturing Co., Fall River, Mass.

Philadelphia, Penn.—The Bradford Mills at this place consume about 6,000 tons of bituminous coal per annum. They have storage capacity for 900 tons, and deliveries are made by Philadelphia & Reading Ry. at the rate of about three cars per week. Address Pur. Agt. M. A. Spencer, Bradford Mills, 28 N. Front St., Philadelphia, Penn.

Granite City, Ill.—The contract for furnishing the Western Fire Brick Co. with its fuel requirements involving approximately 175 tons per month of 1½-in. or 2-in. screenings, has been awarded to the **Borders Coal Co.** on Franklin 2-in. screenings. Address Gen. Mgr. and Pur. Agt. George Hanlon, Western Fire Brick Co., Granite City, Ill.

St. Louis, Mo.—The contract for furnishing the Reliance Buggy Co., with its fuel requirements during the coming season, involving approximately 300 tons of Nos. 2 or 3 washed nut coal per month, has been awarded to the **Southern Coal, Coke and Mining Co.** Address Gen. Mgr. P. E. Ebrenz, Reliance Buggy Co., St. Louis, Mo.

St. Louis, Mo.—The contract for furnishing the New National Oil Cloth Co. with its annual fuel requirements, involving approximately 60 tons of mine-run coal per week, has been awarded to the **Lumaghi Coal Co.** on their Black Brier Southern Illinois coal. Address Genl. Mgr. and Pur. Agt. Wm. Oepts, New National Oil Cloth Co., St. Louis, Mo.

Findlay, Ohio—The contract for furnishing the Findlay Water Works with approximately 2,000 tons of coal during the ensuing year has been awarded to the **Sunday Creek Coal Co.** at 85c. per ton f.o.b. mines. It is understood the contract will be filled on Smithers Creek mine-run coal. Address Purchasing Agent Findlay Water Works, Findlay, Ohio.

Ensley, Ala.—The Bessemer Fire Brick Co., at this place, consume approximately 12,000 tons of mine-run coal per annum. Deliveries are made by railroad, at the rate of 250 tons per week, and the company has storage capacity for 500 tons. The coal is bought in the open market. Address Pur. Agt. J. W. Minor, Bessemer Fire Brick Co., Ensley, Ala.

St. Louis, Mo.—The contract for furnishing the Curtis Manufacturing Co. with approximately 125 tons per week of No. 2 washed nut coal for power use has been awarded to the **Southern Coal, Coke and Mining Co.** Oil was recently substituted for coal at this plant for the purposes of annealing. Address Pur. Agt. John A. A. Hecker, Curtis Manufacturing Co., St. Louis, Mo.

Philadelphia, Penn.—Smith, Kline & French Co., at this place, consumes about 2,500 tons of Highland buckwheat coal per annum. Deliveries are made by railroad at the rate of about one 45- to 50-ton car per week, and the company has storage capacity for 75 tons. Address Pur. Agt. W. G. McHenry, Smith, Kline & French Co., 35 Poplar St., Philadelphia, Penn.

St. Louis, Mo.—The contract for furnishing the Railway Exchange Bldg. with from 100 to 200 tons per day of 1½-in. screenings delivered in wagon-load lots, has been awarded to the **Polar Wave Ice and Fuel Co.** It is understood the contract will be filled on Carterville (Southern Illinois) coal. Address Pur. Agt. Ziegenfiss, Railway Exchange Bldg., St. Louis, Mo.

Chattanooga, Tenn.—The Southern Clay Manufacturing Co. consumes about 20,400 tons of No. 2 mine-run, nut and slack at the Tennessee plant, and about 10,100 tons of the same at the Alabama plant. Deliveries are made by rail and wagon at the rate of approximately 2,500 tons per month. Address Pur. Agt. W. C. Brown, Southern Clay Manufacturing Co., 707 James Bldg., Chattanooga, Tenn.

St. Louis, Mo.—The contract for furnishing the Walsh Fire Clay Products Co. with approximately 1,000 tons per month of 2-in. screened lump coal has been awarded to the **Big Muddy Coal and Iron Co.** The coal for the Vandalia, Mo., plant of the Fire Clay Co. is being supplied under contract by the Mount Olive and Staunton Coal companies. Address Pur. Agt. Parker, Walsh Fire Clay Products Co., St. Louis, Mo.

Waterloo, Iowa—The Waterloo, Cedar Falls & Northern Ry. consume approximately 30,000 tons of Iowa screenings, 1,500 tons of Illinois lump and 150 tons of anthracite nut coal per annum. Deliveries are made by railroad at the rate of 600 tons per week, and the company has storage capacity for 1,000 tons. The company has a three-year contract, which expires Apr. 1, 1918. Address Pur. Agt. F. McDonald, Waterloo, Cedar Falls & Northern Ry., Lafayette Bldg., Waterloo, Iowa.

Italy—A prominent Italian business firm, having large connections, desires to represent a coal company that is in a financial position to fulfil its contracts, and has a quality of coal required on that market. They would have to be in a position to compete with the leading American exporters, on equal terms the correspondent asserts he can always secure the business. Bidders must cut prices to the very lowest point calculating a commission of 10c. per ton on that side. It is absolutely essential that they offer c.i.f. prices west coast of Italy. The above mentioned competitors have often been able to do so. For additional particulars address the Market Editor, "Coal Age."